ARCTIC FOOD SECURITY

Gérard Duhaime & Nick Bernard
Editors

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Cover: Inukshuk’ D. Anikina, oil on canvas
The Inukshuk embodies security of spirit and culture of the Inuit who live and flourish in Northern Canada. This painting, as told by the artist, relates the story of a father-son hunting trip, an occasion that provides a context for experiential teaching and learning of traditional knowledge related to hunting and fishing, and travelling on the land. The Inukshuk is a welcome site for the travellers as it indicates they are on the right path, and points them to good hunting and fishing spots. At the foot of this Inukshuk is a cache of food (dried fish, caribou meat, and berries), which will provide nourishment (both physical and spiritual) and strength to the hunters in their quest for food. In the tradition of the north, they must replenish the cache after a successful hunt, to ensure sustenance for the next traveller.

About the Artist: Darlene Anikina Reid is an Inuit Artist from the western Canadian Arctic (Inuvik, N.W.T.), raised in Hay River, Fort Simpson, Yellowknife, N.W.T., then Calgary and (now residing in) Edmonton, Alberta. She has been painting and illustrating art for 30 years. The Way Of The North (2000) by Rasmussen, Rosalie and Darlene Anikina Reid (Illust.) is listed as one of Alberta’s top ten best books.

Front Cover image courtesy Darlene Anikina; Back cover photos courtesy Gérard Duhaime
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Forward

This Food We Need

Maggie Emudluk 1

Good morning my friends, neighbours, and circumpolar neighbours. Jonhny Adams. The Chair of the Kativik Regional Government (KRG) cannot be with us this morning. So, as Vice-Chair of KRG, I would like to welcome all of you—researchers, and representatives from local and regional organisations from the Circumpolar world. I know many of you are already well informed about the issues surrounding food security in the North.

In the past, food was everything. Our food came from the land; it provided us as clothing, hunting and fishing as a way of life. For us, Inuit, food has always been and will always be an important part of our lives. In the spring and summer, Inuit hunted mainly fish and mammals, marine mammals such as belugas, seals and walrus. Caribou provided fur, meat, and clothing. The two most important parts of our food security were the availability of the animals and the hunter's ability to hunt. Over the past hundred years, this has changed. Outsiders have over harvested our resources of country food. Pollution and climate change have had an impact on wildlife. And at the same time, our communities have changed. Our population is larger, we are becoming part of the global technological economy in the Arctic. We need more food. But at the same time, hunting and fishing equipment are expensive. I would like to talk to you about what has happened to the wildlife relay on a thousand of years.

Let's first look at the beluga. Scientists from the Canadian Federal Department of Fisheries and Oceans say our beluga stock is 1000 in the eastern Hudson Bay and 200 in Ungava Bay. These populations may be on a dangerously low point and become extinct within 15 years. But even if belugas are in danger these days, it wasn't always so. Back in 1800s, whalers by Hudson Bay Company, fishing fleet, hunted beluga almost to extinction. But until the mid-1970s, Nunavimiut still killed an average of 520 belugas in the region every year, nearly double the number caught over the past three years. This year we hunted only 100 belugas. The Department of Fisheries and Oceans has given us $15,000 to help the hunters for the gas they need to use to go to others regions where there is more beluga. For example, where I am from, a small community named Kangiqsualujuaq, we are allowed to kill 25 belugas per year, but for 20 of those belugas we have to go to the Hudson Bay and James Bay. That would be very costly and our hunters were not used to that area. The Department of Fisheries and Oceans is also helping to buy beluga muktuk up there in Nunavut that has been shipped to communities in Nunavik. Eating muktuk is not just something we like to do; we also need this important food source.

1 Vice-President, Kativik Regional Government, Canada.
This brings me to talk about some of the changes in hunting. Whale hunting now means buying skidoos, boats, hunting equipment since one of our only means of transportation then, the dogs, were killed by outside officials, in the 1950s and 60s. Inuit today don't have dog teams. It can cost up to $20,000 to outfit a hunter. We have a Hunter Support Program, set up under the James Bay and Northern Quebec Agreements provisions, which helps hunters to get home out on the land. But still we pay high gas prices, high prices for ski-doos and hunting equipment, etc.

The Kativik Regional Government has negotiated subsidies for gas, and has purchased snowmobiles for helping reaching this goal. We are also fighting for no taxes on gas price because we are paying for changes that were brought from the South. The reality is if you want to go hunting for your food, or if you cannot afford all you need, it is not easy to go in the store, because extremely high prices we pay. For example, for ground beef in Nunavik, you can expect to pay 44% more than you would in Québec city. It would cost you $7.25 in Kuujjuak and $5.52 in Québec City. Or take potatoes for example: you would pay nearly four times more; potatoes will cost you $2.46 in Québec, and $7.80 in Nunavik. In Nunavik, 60% of one’s family income is needed for food supply, as compared to 12% in Québec City. KRG has worked hard to convince the federal and provincial governments for programs that make nutritious food cheaper.

Then there is the health issue at stake. We often wonder how safe our country food is because of outside pollution. People often ask ‘is our food safe to eat?’ and ‘how can we know?’ People have reasons to be concerned about their country food. Study after study has shown many different kinds of country food containing different kinds of contaminant. The fact is that the country food that contains contaminants is still encouraged for use by Inuit. But it is healthier in some areas, and less healthy in some grey areas. Therefore, we need to work on certain areas where we are going to have good food security. We need more study on country food, and we need to know exactly how safe it is to eat. We need to work on better co-management for beluga and other stocks. We need more support for special projects like the Kuujjuaq Char Program that will be sending thousands of bay chars into rivers. We need the government to put our new financial basis like the ones in the South and we need injustices of the past to be repaired now. Our food security is impacted by the South, by over-harvests of the past, by the killing of our dogs, by the contamination of the country foods, and by the production greenhouse gases that will change our environment. These are just challenges that we face and they make sustainable food security very attractive. I am sure you and your regions face other similar challenges.

In conclusion, I hope that all of you will have a very successful, joyful and hopefully happy conclusion of the symposium this week. Also, I would like to thank all those involved and organising this conference. Nakurmik. Thank you.
The Food and Agriculture Organization of the United Nations (FAO) was founded over 57 years ago. At that time the debate, led by the outstanding Canadian leader, Lester Pearson, was centered on food security in Europe and Asia after World War II—a truly daunting challenge. Interest in food security among indigenous peoples and others in the Arctic region is a somewhat more narrow focus but no less important to the peoples facing this challenge. Our results since 1945 are mixed, the food security problems of Europe have largely been overcome but much remains to be done elsewhere.

Perhaps it is more telling that despite the scientific advances and tremendous income growth in the world over the past five decades, food security remains a critical issue anywhere in the world. One can only hope that with your efforts the progress on addressing food security issues in the Arctic can come faster and more broadly to peoples in the region.

I would like to give you a picture of what is happening elsewhere in the world in terms of food security and what needs to be done to address it, so that you can see the parallels to the Arctic region.

The best source for this perspective is from one of FAO’s flagship publications: *The State of Food Insecurity in the World, 2002*. I will start with the bad news first; the reduction in the number of hungry in the world has practically come to a halt. As the foreword to our report states, ‘To put it bluntly, the state of food security in the world is not good.’ In fact, it is quite dismal. The second message is that hunger and malnutrition are largely invisible—they not only maim, but kill millions of people each year. They go largely unnoticed and unreported in the press. The causes are not only natural disasters and conflict, but endemic poverty and a lack of access to food.

But the report does have another, more positive message. Investing in hunger reduction holds potential for enormous economic benefits, for the rich and poor alike. Investing in hunger reduction is not only a moral obligation but makes good economic sense.

Let me put this into perspective starting with a few key facts and figures. By FAO’s latest estimate (1998-2000), the global reduction in the number of people suffering from under-nutrition has nearly ground to a halt. Between 1990-92 and 1998-2000, the number of undernourished people in the world decreased by barely 2.5 million per year. In fact, in most regions the number of undernourished people may be actually growing. In the most recent period, 1998-2000, FAO estimates that there were around 840 million undernourished people, 799 million in developing countries, 30 million in the countries in transition, and 11 million in the industrialized countries.

1 Director, Liaison Office for North America, Food and Agriculture Organization of the United Nations (FAO).
Even the progress that has been made has been quite uneven. In fact, the
marginal gain in reducing the number of hungry is largely the result of rapid progress
in a few large countries. In China alone, the number of undernourished people has
declined by 74 million since 1990-92. Indonesia, Viet Nam, Thailand, Nigeria,
Ghana and Peru have all achieved reductions of more than 3 million.

But these small gains are offset by an increase in the number of hungry of 96
million in 47 countries. If China is set aside, the number of undernourished people in
the rest of the developing world has, in fact, increased by more than 50 million since
1990-92.

The picture is more encouraging if one looks at the number of hungry as a
proportion of a country’s total population. In the majority of developing countries,
the proportion (or what we call the prevalence of hunger) has actually decreased
since the base period of 1990-92, the benchmark period used at the World Food
Summit in 1996. Sub-Saharan Africa continues to have the highest prevalence of
undernourishment and also the largest increase in the number of undernourished
people. Much of this increase took place in Central Africa, mainly in the war-torn
Democratic Republic of the Congo, where the number of undernourished people has
tripled. West Africa, Southeast Asia and South America, have reduced significantly
both the prevalence and the number of undernourished people. But prospects are
troubling for Central America, the Near East and East Asia, excluding China.

Overall, we estimate that there has been a decrease in the number of hungry
people in the world during the 1990s of only 20 million. If the 1996 World Food
Summit target of reducing the number of hungry people by one-half by 2015 is to be
achieved, the number of hungry would need to decline by 24 million per year from
now until the year 2015. Compared with the current reduction of 2.5 million, this is
an increasingly difficult challenge.

One can only conclude from this that unless progress is sharply accelerated,
the world will be very far from reaching the World Food Summit target by 2015. At
the current rate we will be over 100 years late in achieving this goal. Despite the
commitments made by 186 countries in 1996 and reaffirmed at the World Food
Summit: five years later this year, it is apparent that there is a need for much greater
political will and investment of resources devoted to global hunger reduction.

The price we pay for this lack of progress is particularly great yet, despite the
magnitude of the cost, it often goes unnoticed. Disasters and famines hit the
headlines, but ‘covert famine’ that is the focus of our analysis goes largely unnoticed
killing millions of people each year. The poor are paying the highest price for this
lack of progress. Where hunger is widespread, mortality rates among infants and
children under five are high and life expectancy is low.

Six million, or one in seven, children in poor countries where hunger is most
common die unnoticed before reaching the age of five. Between 50-60 percent of all
childhood deaths in the developing world are caused directly or indirectly by hunger
and malnutrition. In the worst-affected countries, a newborn child can look forward
to an average of barely 38 years of healthy life, compared to over 70 years of life in
24 wealthy nations.

Most children die because they lack adequate food and essential nutrients
leaving them more vulnerable to infectious diseases. The four biggest killers of
hungry children are diarrhoea, acute respiratory illness, malaria and measles.
Over 2 billion people worldwide suffer from the ‘hidden hunger’ of micronutrient malnutrition. Their diets supply inadequate amounts of vitamins and minerals such as vitamin A, iron, iodine, zinc and vitamin C.

Children and women are most vulnerable to the lack of micronutrients—children because of the critical importance of micronutrients for normal growth and development and women because of their higher iron requirements especially during childbearing years and pregnancy. Between 100 and 140 million children suffer from vitamin A deficiency, which is estimated to lead annually to 250,000 to 500,000 cases of permanent blindness. Some 20 million people worldwide are mentally handicapped as a result of iodine deficiency. Limited diversity in diets is a major cause of micronutrient malnutrition and can affect those in any region of the world, including the Arctic.

A further price we pay from chronic hunger is reflected in reduced peace and security. Food insecurity is both a consequence and a cause of conflict in the world. Wars, civil strife and the lingering effects of past conflicts gave rise to food shortages in 15 of the 32 countries facing food emergencies in the world today.

More than half of the developing countries where hunger is most prevalent—those with more than 20% of the population hungry—have experienced wars, civil strife or other armed conflict in the decade of the 1990s.

Armed conflict is a major cause of structural food insecurity. It often prevents farmers from producing food and cuts off access to food by others by disrupting transport and markets. A recent FAO study estimated that in sub-Saharan Africa, conflict resulted in a loss of agricultural output of US$52 billion between 1970 and 1997. For all developing countries agricultural production losses of US$4.3 annually were estimated—enough to have raised the food intake of 330 million people to the minimum required level. Without conflict, we would have already been well on our way to achieving the goal of less than 400 million hungry by 2015.

While measuring the impact of conflict on food security is relatively straightforward, the way in which food insecurity contributes to conflict is more indirect. What can be said is that conflict and food insecurity tend to be prevalent in the same locations and that they are both consequences of a common set of risk factors, such as poverty, repressive political systems, degradation and unequal access to natural resources, and weak institutions.

While these facts are sobering, another set of facts and analyses—identifying what needs to be done to address the problems of hunger in the world—is more critical. Clearly the cost of inaction is prohibitive. Investing in hunger reduction holds potential for enormous economic benefits, for the rich and poor alike. If the World Food Summit target was on track to being achieved, FAO estimates the benefits to the world economy to be at least US$120 billion per year.

Faced with a slowdown in the rate of hunger reduction, FAO is calling on the international community and developing countries themselves to increase public investment in sustainable agricultural and rural development and wider access to food. This call was launched at a side event of the World Food Summit: five years later and reiterated at the World Summit on Sustainable Development in Johannesburg.

In developing countries, 70-75% of the poor and hungry live in rural areas and depend, directly or indirectly, on agriculture for their livelihoods. Yet data on private investment, public expenditure and external assistance to agriculture show
that the sector receives less investment and support in the very countries where hunger is most widespread.

Most of the investment to stimulate growth in the agricultural sector comes from private sources, mostly farmers themselves. A look at capital stock per worker in primary agriculture in developing countries shows that it is extremely low and stagnant in countries where the prevalence of hunger is high compared to those countries that have managed to reduce hunger.

Public investment in infrastructure, agricultural research, education and extension is essential for stimulating private investment in agriculture. But actual public expenditures for agriculture and rural development do not reflect the importance of the agricultural sector to the national economies and livelihoods of the people. For the group of countries where the prevalence of undernutrition is highest, the share of agricultural public spending falls far short of matching the sector’s importance in the economy.

The external donors do not do much better. Development assistance is critical for very poor countries with limited ability to mobilize domestic private and public savings for investment. Yet official development assistance for agriculture declined by an alarming 48 percent between 1990 and 1999 in real terms.

Furthermore, the diminished development assistance did not target the neediest countries. For the last three years of the decade, countries where less than 5 percent of the population was undernourished received more than three times as much external assistance per agricultural worker as countries where more than 35 percent of the population was undernourished.

To accelerate progress in reducing hunger and reach to goals of the World Food Summit, FAO has proposed an ‘Anti-Hunger Program.’ This blueprint calls for renewed public investment in agriculture and food security by the whole range of public actors, from the governments of developing countries to donor governments in industrial countries.

To fight hunger effectively, a ‘twin-track’ approach is required combining agricultural and rural development with targeted programmes such as direct food aid that enhance access to food by the most needy. The two tracks are mutually reinforcing: one creates livelihood opportunities; the other equips the hungry to take advantage of these opportunities.

Coupled with an enabling policy framework, an additional public investment package of some US$24 billion annually is needed to bring hunger reduction back on track. The investments would include:

- US$ 2.3 billion to raise farm productivity in poor rural communities
- US$ 7.4 billion to promote sustainable use of natural resources
- US$ 7.8 billion to cover investments in rural infrastructure and market access
- US$ 1.1 billion for agricultural research and extension, and nutrition education
- US$ 5.2 billion for programmes to enhance access to food by the most needy.
The State of Food Insecurity in the World 2002

The costs of these investments for agricultural and rural development, on average, across regions, would be shared equally by the international donor community and recipient developing countries/countries-in-transition. This would result in, on average, a 20% increase in developing countries’ budgets for agriculture and rural development (or US$8.0 billion per year) and a doubling of Official Development Assistance (ODA) and non-concessional lending (or US$8.1 billion per year) which represents only a tiny fraction more of rich countries GDP. This is not as big an increase in ODA as it seems. In reality, it is only taking agricultural development assistance back to the levels of the late 1980s.

It is a small price to pay. Without investment in our global future, not only will our economic well-being be less but our overall peace and security will remain challenged. Too often we think of the problem of hunger as insoluble, the hungry have always been with us. This need not be the case! Conferences like this one today are filling gaps in our knowledge but by and large a lack of knowledge about the problems and solutions to food security is not our main constraint. We know the magnitude of the needs. We know what needs to be done. Now, we all need to work to generate the political will and resources to eliminate the scourge of hunger from the Arctic and all of the regions of the world.
Introduction

A Research Agenda to Address the Global Challenge of Food Security

Gérard DUHAIME and Nick BERNARD

RESEARCH FOUNDATIONS

How does society deal with one of the basic requirements of the human condition—the need for food? How has it resolved, if indeed it has, the food supply problem? What roles do economic, political and social institutions, created by the very societies they serve, play in providing for this very basic necessity of life? What are the impacts of other elements associated with the human condition, whether pre-existent—such as the geographic space in which life unfolds, or resulting from social action—such as demographic trends? Can individuals, in their incessant search to ensure the conditions necessary for the reproduction of life, influence determining factors that are beyond their direct control, such as the economic organization of society, and change the precariousness of the search for food into food security? How do social forces interact to create a state of food security? What does this say about how Arctic societies function? These are the types of questions this book endeavours to answer. This publication is the result of a research program carried out from 1998 to 2003 in certain regions of five circumarctic countries: Alaska, the Canadian North, Greenland, Finland and the Northwestern region of the Russian Federation.

This program had its origins in a collaboration the authors had with Éric Dewailly, Minnie Grey and other colleagues in the mid-1990s. By combining the resources of our respective teams, we had estimated the economic impact of changes in food consumption with a view to mitigating the harmful effects of environmental contamination. Based on this experience, we became convinced that food security was a central issue in the Arctic. Contrary to what we might have imagined, this problem had not been resolved by the drastic changes that had occurred since the mid-20th century, the most important having been motivated by the poverty which had become widespread in certain regions of the Canadian North. The construction of social housing, improved access to nursing and medical services, and monetary support for families certainly did much to improve the general socioeconomic condition of Arctic inhabitants. However, these changes did not solve all the problems.

In 1998, our starting point was as follows. Food security in the Arctic appeared to be threatened in a number of ways. For example, we knew that there was

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a severe imbalance in the food economy. The great majority of foodstuff was produced outside the northern regions and imported. The export of local fish and game was negligible and these commodities were generally unprocessed. Subsistence fishing and hunting were in decline and had become more individualistic and capital-intensive. This imbalance reflected the Arctic economy generally, characterized by a decrease in the value of traditional activities, the massive export of non-renewable resources, an increase in salaried employment and transfer payments from the government sector, and a concomitant rise in market consumption and imports. In short, this was an economy largely driven from outside; characteristics that were not without consequence. The dwindling proportion of country food consumption, offset by a growing proportion of imported food in the local diet, depended to a large extent on the availability of monetary income, which could not be taken for granted in the Arctic economy. Moreover, these changes increased the number of health risks associated with the consumption patterns of industrialized nations and reduced the benefits associated with the intake of certain domestic products.

In addition, the Arctic Monitoring Assessment Program (AMAP), in which one team researcher, Eric Dewailly had actively participated, identified the presence of contaminants in the Arctic, a situation which had not existed just a short time earlier. Even country foods were threatened—contaminated by pollutants such as chlorinated organic compounds and heavy metals, transported primarily by air currents and bioaccumulated through the food chain. These discoveries gave rise to profound concerns for people of the Arctic, where the consumption of game, fish and plants was still commonplace. Faced with such challenges and questions, our northern colleagues were looking for some certainties in order to be able to provide the public with some answers.

Should this have been surprising in an era when society was aware of environmental problems and living conditions of Aboriginal Peoples? Land claims agreements could or should have partially addressed such issues, since they contain provisions related to land rights, natural resource exploitation, environmental protection, and self-government arrangements. As for transborder environmental problems, such as the migration of contaminants to the North Pole, international environmental law should have limited the risks. But faced with the situation as we know it from sectorial studies on population incomes, dietary assessments and contamination, we had to acknowledge that these issues were not being addressed.

Indeed, the knowledge we had was very fragmentary, and not nearly sufficient to provide satisfactory answers to the questions put to us by our collaborators. During our exchanges, and after having patiently listened to our scholarly presentations, amply illustrated by detailed statistical tables and pie charts, Minnie Grey reminded us that what she really needed to know was what to tell the people of her region when they asked whether they should continue eating country food or avoid it for fear of poisoning themselves. If the latter, how were they to pay for store-bought food? If they had to change their dietary habits because of pollution caused from the industrialized world, were there ways to put a stop to this, and was there any recourse to obtain compensation?, and so on. Answers to these types of questions would not be found within the narrow confines of our individual scientific interests. If we wanted to arrive at practical and relevant answers, not only did we
need to examine these questions in greater depth within each of our disciplines, we also had to systematize knowledge exchange between disciplines.

Moreover, we had to consider a reality of scientific research in the Arctic: dispersion. Researchers of northern issues form a community that is large in number, but one that is very scattered and lacks cohesion. At the time of this research, the International Arctic Social Sciences Association (IASSA) had some 400 members in good standing from roughly thirty countries, and more than 1,000 members had been identified since its creation in the early 1990s. The number is undoubtedly even higher in the natural sciences. Yet in a university setting, generally characterized by a rather individualistic tradition marked by leading experts, significant collaborations are rare and the links between disciplines rudimentary. This dispersion is also a reflection of the fact that the Arctic territory is immense and is made up of a large number of regions in which political, social, cultural and economic realities are diverse. Our challenge was to try to mobilize researchers who were not in the habit of having their work scrutinized, let alone by colleagues from other disciplines. At the same time, we had to try to promote a vast geographical coverage so that the comparison would enrich each of the regional analyses.

In short, by relying on the successes of our past collaborations, we were convinced that we could make significant knowledge gains by systematizing the dialogue between researchers from various disciplines and comparing the greatest possible number of empirical situations.

Our first motivations were undoubtedly scientific curiosity and the desire to conduct good science in order to find answers to pressing and socially relevant questions. But there were other motivations. At the time, the Groupe d’études inuit et circumpolaires (GÉTIC), founded at Université Laval in 1987, was expanding, and the Board of Directors were considering restructuring the research group as an inter-university research network. Major research programs represented an undeniable asset from this vantage point, given that it was necessary to show university organizations and national research councils (called upon to support this type of research), our group’s ability to meet the current eligibility criteria: productivity measured by grant awards and publications, critical mass of researchers, synergy between the members, etc. As researchers, we sensed the usefulness of undertaking a major collaborative initiative to answer far-reaching questions; as educators in science, we were driven by respectable opportunism. Finally, one of the major motivations behind the initiative was social. Our small research group already enjoyed working together, derived satisfaction from a job well done, and had forged relationships that extended beyond our professional lives. We wanted to broaden this circle and invite certain colleagues whose work we were familiar with to join us. Finally, as university professors committed to the training of young scholars, we knew that a multidisciplinary team mobilized around an international research program governed by major concerns for our aboriginal collaborators represented a privileged learning environment. The students who would participate in this endeavour would be provided an exceptional opportunity to explore these questions, gain knowledge through the experience of multiple approaches and methods, and, above all, connect with the people of the Arctic.

The scope of the research, both geographically and thematically, and the diversity (social, political, economic) of the territory to be covered represented a major challenge. We wanted to bring together an international team that would focus
its efforts on several areas of the Arctic, but the sheer magnitude of the undertaking threatened to torpedo the project’s cohesion and our efforts at integration. We had to limit the research question to priority issues and focus our work on certain carefully defined geographical areas. The case of the Russian Far North—a geographical area that represents half of the circumpolar world—was particularly difficult. The population, which is ethnically diverse, is much more numerous than everywhere else, and the general socioeconomic situation following the collapse of the Soviet Union was nothing less than catastrophic. But Russian collaborators upon whom we would have liked to rely were so few in number and had such limited resources to participate fully in a project of this scope that we had to abandon the idea of systematically covering this area. This decision was difficult especially since we understood how disastrous the food situation was, based on the moving observational reports submitted by colleagues Boris Chichlo and Asen Balikci following their sejourns in the Russian Far East. Their observations have since been confirmed several times over in publications (including those from official sources), reporting on the desertion of many villages, the emigration of hundreds of thousands of Northern residents to the southern republics of the Russian Federation, the drastic decline in the reindeer herds, and so on.

It was against this backdrop that we designed the study on *Sustainable Development in the Arctic. Conditions for Food Security*, funded by the Social Sciences and Humanities Research Council as part of its Major Collaborative Research Initiatives Program. Originally, 19 researchers from about ten universities and research institutes, and as many PhD and Masters students from each of the disciplines represented in the study took part in this initiative.

**THE THREE AXES: A CONTEXTUAL FRAMEWORK**

One of the major challenges of such a multi-faceted program is to propose an integrated vision of the research questions, in such a way as to allow each researcher and research partner to clearly situate their contribution to the joint undertaking. It is for this reason that we developed a global conceptual framework, described in the first volume of our work and to which certain contributors to this volume will make explicit reference. The model proposed that the research team consider the state of food security or insecurity as the result of a multitude of systemic interactions and feedback between: 1) the physical environment; 2) characteristics of the social system (demography, health, technology, economics, stratification, political and legal systems, culture) whose typology had been inspired by the works of political scientist Léon Dion; 3) food procurement mechanisms (from production to distribution and circulation of industrial foodstuff like that produced by customary activities); and, 4) the immediate factors impacting food consumption (availability and accessibility). In summary, we proposed examining this vast array of conditions and influences to assess the state of food security in each of the regions under study, and, above all, to aim at a deep and comprehensive understanding of the situation.

Furthermore, we proposed qualifying these assessments in terms of the concept of sustainable development. In 1971, the first World Conservation Strategy identified three fundamental objectives of sustainable development, namely: maintaining essential ecological processes, preserving biological and genetic diversity, and ensuring the sustainable use of species and ecosystems. A fourth
objective, ensuring the sustainability of human systems, was added in 1980. The World Commission on Environment and Development (Brundtland Commission) released its report in 1987, in which sustainable development was coined as: ‘(...)
a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.’

This definition is one of many and did not meet with unanimous support at the time. However, the majority of existing definitions emphasize common elements that were echoed in the report on the United Nations Earth Summit in Rio de Janeiro in 1992: the need to tie economic development to sustainability; the need to adopt sustainable consumption models; the need to establish an efficient legislative framework for all levels of jurisdiction; the need to involve local populations in all stages of the development process, including monitoring, action and solutions; the need to protect human health and the concomitant need to ensure food security, that is, ‘the various conditions that must be satisfied and the measures that must be taken during the production, processing, storage, distribution and preparation of food products in order to ensure that they are wholesome, healthy and safe to eat.’

The concept of sustainable development was adapted for the Arctic by Oran Young in 1992, and translated as: ‘the establishment of economic systems capable of maintaining themselves over time without disrupting major Arctic ecosystems, or destroying the distinctive cultures of the Arctic’s permanent residents.’ According to Young, to attain this objective three basic goals must be met, namely: ‘de-coupling Arctic economies from the economies of the dominant metropoles; diversifying Arctic economies which are heavily dependent on a single industry or product; and, sustaining informal economies particularly in the form of subsistence hunting and gathering.’

The issues of sustainable development and food security have captured the attention of all major stakeholders interested in the Arctic, particularly Aboriginal groups and international organizations. Since its creation, the Inuit Circumpolar Conference (ICC) has made sustainable development—including the local production of food for domestic consumption—a priority, and has participated actively in international forums dealing with this issue. Similarly, the Arctic Council, which was founded in Canada in 1996, has environmental protection as its prime concern and has identified sustainable development as the way to improve the economic, social and cultural welfare of peoples living in the Arctic. Finally, international scientific groups such as the International Arctic Science Committee (IASC) have defined studies on sustainable use of living resources in the Arctic as a priority. Consequently, it would no longer be enough for our project to simply identify the state of food security or insecurity of the Arctic; we had to qualify the assessment in terms of sustainability. The conceptual framework we proposed specified the diagnostic criteria.

We were not concerned about the epistemological criticisms disparaging the systemic approach ensuing from the works of David Easton because it might overlook the change in and the reflexive capacity of society, class struggle, etc. Besides, our task was not to propose a food security theory, rather it involved designing an interactive model that would make it possible to explicitly include the greatest number of factors or variables in the analysis. Nor were we swayed by
criticisms leveled against the fitting, albeit somewhat inconsequential, use of the sustainable development concept (criticisms to which we ourselves had contributed), alleging that this concept was first and foremost normative and of little use as a basis for scientific discovery. The conceptual framework that we proposed gave each researcher the necessary latitude to position their work within any one of the schools of thought specific to their discipline to shed light on the work by using the theoretical approaches they deemed most appropriate to analyze and interpret the reality observed. Similarly, each researcher or group of researchers made their own methodological choices. It would have been illusory to want to proceed otherwise, as methods and observation techniques vary from one discipline to the next. Some researchers chose to create data by using various field survey techniques such as the central approach; others focused on a meticulous analysis of secondary sources, and so on. The objective of team meetings was to allow researchers to discuss theoretical and methodological approaches, results and interpretations. This organizational paradigm served to bring abundant and diverse material with which to describe situations with the highest degree of nuance, while keeping the discussion focused in the context of the integrated study.

From the range of possibilities, we decided to focus the research on three main axes along which to describe, analyze and understand the sustainable food security situation in the Arctic: socioeconomic aspects; demographic and social-health factors, and political and legal frameworks.

**Socioeconomic Aspects**

Despite international interest in the economic development of circumpolar regions, there was no statistical picture providing a comprehensive view of the economic situation in the Arctic when we began our study. The existing literature was markedly dispersed and available data was not standardized, making comparative study difficult. One conclusion could be drawn, however: that the Arctic regions were not homogeneous. Several characteristics were common throughout, but there were strong regional variations. Later studies helped fill these gaps, notably research that resulted in the *Arctic Human Development Report* in 2004, which provided the first comprehensive review of the circumarctic economic system. At the time of our study, however, no such broad view was accessible.

For example, we knew that the Nunavik (northern Quebec Inuit) economy was characterized by a dominant government sector, more imports than exports, a weak private sector, and preponderant wage employment. Similar characteristics had been documented in other parts of the Arctic, including Greenland, Alaska and the Canadian Northwest Territories, with variations according to region, ethnic groups and sociopolitical conditions. Moreover, major changes were taking place to varying degrees throughout the northern regions, adding to existing differences and making it more difficult yet to compile a global picture without taking regional variations into account. For instance, while Alaska's North Slope Borough was experiencing a serious fiscal problem, the Canadian North was experiencing a mining boom (Yellowknife, Voisey Bay, Raglan), generating local revenue and increased threats to the environment. In Greenland, the collapse of cod stocks was having a severe impact on small fishing and hunting communities, increasing the need for transfer payments.
These characteristics and changing trends were impacting the food economy. The production of country food remained extremely important in those regions, carrying a more than symbolic value in contemporary times. Various studies have shown the quantitative importance of country food production to community economic structure and to household budgets. However, it appeared that country food was no longer sufficient to maintain subsistence levels and had to be compensated with market food. In fact, it was market food that sometimes assured subsistence—in the Saami population, for example, or among children. In a word, there was a greater dependence on store-bought food, findings that were corroborated by nutritional surveys indicating that store-bought food was the major source of energy, carbohydrates, fats, and vitamins. Furthermore, the production of country food was dominated by the market sector; it had therefore become more expensive to acquire.

The literature showed that the Arctic was entrenched in the economic order and capitalist mode of production, even though cultural identities and traditional practices persisted. Despite numerous similarities, the literature also revealed that the Arctic was, to a large extent, heterogeneous. However, there were no regionally- and nationally-based studies to permit international comparison, i.e., make it possible to measure the economic importance of market and non-market food sectors, and identify the structural, organizational, and cultural factors that play a role in development.

Health and Nutritional Factors
Although country food can be locally abundant, Arctic populations have faced dietary deficits of various types throughout its history—as a result of epidemics, natural cataclysms, or social conflicts. However, even if the dietary balance of these populations has fluctuated over time, they nevertheless have survived collectively. Rising monetization, various incentives to become more sedentary, and diverse adaptive strategies have contributed greatly to reducing the dramatic impacts of these dietary deficits, but such changes have also led to new or different problems. These include health issues caused by changes in consumption patterns, such as hypertension, diabetes, tooth decay, anemia, and possibly decreased resistance to infections.

These health problems might be further aggravated, directly or indirectly, by various industrial projects operating or being established throughout the Arctic. For example, mega-developments can contribute to nutritional imbalances by: limiting the time available for hunting, distancing workers from normal distribution networks, disrupting land use patterns due to environmental impacts, or by affecting spending patterns. However, at the same time, research has shown that the cash flow generated by economic development can actually enhance country food procurement and consumption. Nutrition patterns can also be affected by economic activities in other parts of the world, as evidenced by the long distance transportation and bioaccumulation of contaminants, which have cast doubt on Arctic country food safety, sometimes even affecting sharing networks. Although the increased availability of store-bought foods is an important factor in the overall decrease in dependence on country food, other less-documented factors can also determine dietary changes, such as consumer preferences (e.g., in terms of benefits sought,
appearance, or taste) and socioeconomic disparities (e.g., social status, generational differences).

When this program was initiated, there had already been a great deal of work conducted on the nutrient content of specific country food, but little had been done to illustrate the importance of these nutrient sources on the health of the population. Epidemiological research and modeling have highlighted the fact that country food provided not only a source of various classic nutrients (e.g., proteins, vitamins), but it was also a major factor contributing to health protection, due to the presence of, for example, selenium and omega-3 fatty acids in marine mammals. Arctic country foods are often more nutritionally complete than store-bought foods. Moreover, research undertaken to date aiming to characterize health problems resulting from environmental contaminants has also shown that even though country foods contain various contaminants, the health risks associated with the ingestion of these contaminants were uncertain. Furthermore, the nutritional benefits of country food consumption outweighed the expected benefits of risk reduction scenarios. Moreover, various reduction scenarios would greatly impact nutrient intake and social and economic costs.

In light of the results of these risk/benefit analyses, various authors have stressed the need for the continued consumption of country food for reasons varying from health protection to cultural identity. The question that then had to be addressed was whether or not the promotion of country food consumption would be feasible, from both an economic and a health standpoint, and further, how the message could be formulated to meet Inuit expectations.

Legal Aspects
The legal analyses of sustainable development in the Arctic center on three fundamental issues: aboriginal land rights, self-government, and environmental law. It was felt there could be no realistic hope of achieving sustainable development without a sound regime of rights pertaining to the use of land and renewable resources, effective local control over development policies, and adequate protection of the environment.

There was no shortage of general writings on aboriginal land rights in Alaska, and our knowledge of the international legal perspective was growing steadily. However, there was a lack of detailed literature dealing with land and resource rights regimes in force in Nunavik, Greenland and Norway. Substantial work on primary legal sources such as statutes, land claims agreements, and judicial rulings was required in order to ascertain the nature and extent of aboriginal entitlements to land and resources in the various jurisdictions. Moreover, very few authors had attempted to assess land and resource rights arrangements in light of sustainable development principles, and no systematic comparative assessment had been conducted.

Issues related to self-government arrangements in Alaska and Greenland had already attracted the attention of scholars, and there was an emerging body of general descriptive literature on the Sami Parliament system in Norway. The difficulty of defining the scope of aboriginal self-determination under international law had also been substantially canvassed. On the other hand, the limited self-government arrangements applicable in Nunavik, and the more ambitious ones currently being negotiated, had not been studied to any significant degree by legal
scholars. The jurists who had explored the regime established as a result of the James Bay and Northern Quebec Agreement (JBNQA) had been more concerned with the formal status of the arrangement than with specific substantive issues such as the scope and effectiveness of aboriginal autonomy.

When this program was launched, legal scholars who specialized in environmental law had yet to undertake any thorough investigation of the unique issues raised by the implementation of sustainable development strategies in the Arctic. Moreover, such issues were largely overlooked in the Bruntland Report. Although there was a significant body of general literature on environmental law and how it articulates with sustainable development, no systematic attempt had been made to compare and evaluate the various legal regimes operating in the Arctic regions. There was also a pressing need to spell-out legal principles and strategies that were specifically tailored to the unique environmental challenges of the Arctic.

In a word, there were numerous and major deficiencies in the state of our knowledge in the context of rapid and profound. The priorities identified at national and international levels by scholars, Aboriginal groups, and governments called for urgent action. This was the challenge our research team chose to accept in devising an integrated research program that would systematically explore the economic, health and legal aspects of food security within a sustainable development framework.

A SHOWCASE

The research program lasted five years, each year marked by team meetings. The first meetings served to measure the scope of the scientific challenge. Beyond deciding the organizational structure of the project, from delineating the specific regions and questions that would define the study, to the methodological approaches to use—all questions that veteran researchers know how to address pragmatically—one of the most difficult issues to deal with was interdisciplinary communication.

The first meeting was unforgettable. In a room featuring a panoramic view of Université Laval, some thirty researchers and collaborators—many meeting for the first time—one after another presented their vision of the program. Several raised the notion of ‘subsistence,’ and it soon became apparent that no one had the same definition of the term. For some, subsistence corresponded to the way of life of the Aboriginal peoples of the North, intrinsically tied to traditional activities founded on an Aboriginal view of the world, which in turn represented a central element of the program. For others, subsistence was a result of commercial economic activity alone, and the production of country food from hunting, fishing, gathering, and herding represented merely a form of survival of very little economic importance. The animated discussions that ensued (and this was not the only subject that sparked such reaction), brought to mind colliding tectonic plates, producing thunderous noise that is heard by all but understood by none, until the brittle ground cracks underfoot. Paradoxically, the dialogue was, for all intents and purposes, unintelligible because each discussant made abundant use of discipline-specific terminology, indeed their own jargon. A case in point: a sociologist speaks about ‘norms,’ referring to the various ways of acting adopted by a social subject to give their action the most appropriate orientation within their environment; whereas the legal scholar talks about norms in reference to a rule of law; and finally, a toxicologist uses the word to
describe a threshold, at which a contaminant might be safe for human health, for example.

To address these fundamental problems, and deal with them immediately, required a strategy. What came to mind was the ‘Templars Plan,’ harnessing the telluric forces to control the uncontrollable, as alluded to by Foucault’s Pendulum. We had to dissolve those colliding tectonic plates into magma, and form a new continent. Indeed, our objective was not to create a large volume of sectorial research initiatives; our principal objective was to produce integrated knowledge.

With the informed advice of Charles Bélanger, former rector of Laurentian University and specialist in the management of large organizations, and that of Milton Freeman, Senior Research Scholar of the Canadian Circumpolar Institute of the University of Alberta, who joined our research team, we endeavored to contain the commotion. We challenged participants to strive for a common goal, contributing their disciplinary-based knowledge, but reporting on the progress and results of their research in a language that would be understandable for everyone. From that point onward, things began to happen, and subsequent meetings were opportunities for mutual enrichment. Nevertheless, the integrative approach aspect of the project remained a colossal undertaking. Several members of the team devoted a great deal of effort to this task, especially during the last two years of the program.

This volume brings together some of the most important results of our work. For organizational purposes, the results are presented by geographical area. Each chapter integrates the discoveries for each of the regions studied; several texts present the results of specific research. Several plates reproduce a series of posters prepared for the symposium held at the end of the project, attended by some 70 participants having been involved in the project, including numerous collaborators from aboriginal organizations from all the Arctic regions concerned. These plates provide a glimpse of the diversity of the work undertaken and testify, in particular, to the important role played by graduate students in the research team.

Not all members of the research program team appear as authors in the contributions to this volume. Nevertheless, all team members published the results of their work in numerous knowledge transmission tools throughout the course of the research. Readers who wish to learn more can consult the list of references that we drew up at the end of the project, bearing in mind that this list would be considerably longer if we were to include all of the publications arising from the program, especially those published since the production of this collection. Consequently, this volume should be considered a showcase rather than an inventory: it provides a sampling of what our program has been able to contribute to the advancement of knowledge.

We are also acutely aware that we have not covered all aspects of the research in this treatment. Indeed, while the plan of the work follows the systematic approach that we endeavored to implement throughout the research program, its content is not as systematic. With the exception of the Conclusion, that summarizes our work in each of the regions of the study, the content of each chapter varies considerably. For example, in the chapter dealing with the Canadian North, Nunavik is the subject of several contributions; other regions are less well documented. Similarly, all disciplines are not represented in all of the study regions. As a result, this collection may seem to be lacking in coherence, the contributions unequal and, when all is said and done, the product much less ambitious than the research program
and results it is meant to describe. While this is true, we are nevertheless proud of the product of our efforts, for it is a reflection—albeit partial—of the work that we accomplished collectively. It reflects the diversity of regional situations and the major issues we were able to identify, as well as the diversity of the interests of the research team. It also mirrors the characteristics inherent in the initiative and the manner in which it had been undertaken.

We have described the motivations that led us to design this research program and the research and funding strategies that we followed. But we have said nothing about the strategies that we could have adopted and which might have led to a more systematic and exhaustive publication. When we launched the program, we had but a very superficial knowledge of the political mechanisms for garnering support for international research in the Arctic. We explicitly sought to relate our work to the concerns expressed by our Aboriginal partners from all the regions in question. However, at the time, we did not understand the possible advantages of aligning our work within the interests of the Arctic Council, which was still in its infancy. Truth be told, the path we adopted can be attributed equally to well-founded perceptions of what such an alignment might require or entail.

For example, it was felt that the steps that would have to be taken to have an organization such as the Arctic Council endorse our project would undoubtedly have required considerable resources. Furthermore, the endorsement might have been more symbolic than tangible, and the alignment might have entailed an obligation to deliver results according to a schedule dictated by that organization, that may or may not have been in line with the research schedule, which was determined by the scientific and logistical requirements of the program and the requirements of the financial backer—the Social Sciences and Humanities Research Council of Canada. In short, we saw only potential constraints, and did not want to be subject to them; we wanted to devote all our energy to research, not to lobbying and public relations.

At the time, and in retrospect, we were not aware of the extraordinary potential that the Council’s endorsement of a research program of this scope, however symbolic, represented for mobilizing resources. If we had adopted that approach, we might have been able to increase the number of regions studied, team up with numerous other colleagues in other nations, and raise additional funds for the project. We might also have succeeded today, to be presenting a much more comprehensive and systematic report as the Arctic Human Development Report. But we made other choices, and so this volume reflects one approach to research, namely, one where a group of individuals and collaborators became passionate about an urgent research question, sought the support of a financial backer, set to the task of doing excellent research, and produced this volume as a means of transferring the knowledge gained.

As explained earlier, we had to limit our ambitions to fit in the context of a grassroots research initiative. It might have been altogether different had we followed another model, such as a ‘top-down’ initiative, whereby for example, the Arctic Council, as a programming priority, would approach members to participate in a Pan-Arctic initiative that would culminate in a report. In such a scenario, a systematic and exhaustive plan is adopted from the outset, and the necessary legitimacy is given to the commissioner of the project to dictate or ‘commission’ contributions from highly renowned researchers to produce an attractive and coherent publication.
Despite the limitations of our approach, we believe that the program and the products of the research, including this volume, have made a significant contribution to the advancement of research in an area of great importance for Arctic residents.

Finally, we have opened these pages to certain authors who were not initially part of the research team. Some contributions were solicited to address the lacunae, if only partially, and certain foreseeable shortcomings in the program. Such is the case for the contribution by Larissa Abryutina concerning the situation in Russia. Other contributions are from colleagues who, along the way, showed a marked interest in this work because it tied in with their own concerns. This is the case for contributions such as those of Marcelle Chabot and of Chris D. James Paci et al.

Finally, we endeavoured to synthesize the contributions in a concluding chapter, in order to address the questions that inspired our exploration into the contemporary reality of the inhabitants of the North as they relate to food security.

LIST OF THE PUBLICATIONS ORIGINATING FROM THE PROGRAM


ALASKA
Chapter One

The Legal Protection of Subsistence: A Prerequisite of Food Security for the Inuit of Alaska*

Sophie THÉRIAULT, Ghislain OTIS, Gérard DUHAIME and Christopher FURGAL


INTRODUCTION

The concept of food security was put forth by the United Nations’ Food and Agriculture Organization (FAO) in 1973 in the aftermath of the food crisis that devastated a number of third world countries.1 This concept was initially given a very narrow meaning, as it referred solely to the global availability of adequate food supplies necessary to meet the needs of a growing world population.2 It has since evolved considerably, thanks to a more sophisticated understanding of the many factors and conditions that affect the capacity of individuals to obtain adequate and sufficient food.3 Food security is now defined as the capacity of individuals to ‘have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.’4 The purpose of this paper is to recognize and critically examine the link between the challenge of food security and the efficient legal protection of the traditional hunting, fishing, and gathering activities of the Inuit people of Alaska.5

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2. See id. (calling for ‘a world food security system which would ensure adequate availability of, and reasonable prices for, food at all times’).
5. This paper is part of an interdisciplinary research project on sustainable food security in the Arctic. Although a substantial part of our research is also
The Alaskan Inuit have been using their environment and its natural resources for nutritional, material, social, and ritual purposes since time immemorial. Subsistence still constitutes a central component of Alaskan Inuit culture, identity, and economy. Indeed, for those Alaska Natives who engage in subsistence uses, the very acts of hunting, fishing, and gathering, coupled with the seasonal cycle of these activities and the sharing and celebrations which accompany them are intricately woven into the fabric of their social, psychological, and religious life.

In Alaska, the legal protection of subsistence has given rise to a controversy that occupies an ever-greater place in the state’s political and judicial landscape. The controversy pertains to the allocation of fish and game among different users and, in particular, the recognition of a priority for rural residents and Natives. Alaska Natives demand better legal protection for their customary and traditional subsistence activities in the face of increasing competition for access to fish and game, intensifying exploitation of non-renewable resources, growing environmental pollution, and continuing animal rights activism. On the other hand, recreational and commercial users of natural resources oppose any preferential access to fish and game and claim their right to equality. This conflict has resulted in heated political debates and numerous lawsuits over the last three decades.

relevant to other Alaska Native communities, this paper focuses on the Inupiat and the Yup'ik peoples. We will use the generic term "Inuit" to refer to these two groups.

7. ALASKA NATIVES COMM’N, 3 FINAL REPORT 2 (1994).
9. CASE & VOLUCK, supra note 8, at 258.
10. See generally id. at 283–309 (providing a description of the impact of ANSCA and ANILCA on the state’s political scene); STEPHEN HAYCOX, FRIGID EMBRACE: POLITICS, ECONOMICS AND ENVIRONMENT IN ALASKA 149–74 (2002) (describing conflict between Alaska Natives and others arising out of ANSCA and ANILCA).
11. CASE & VOLUCK, supra note 8, at 285.
13. Id. at 88.
14. See CASE & VOLUCK, supra note 8, at 28587; HAYCOX, supra note 10, at 152; Richard A. Caulfield, Alaska’s Subsistence Management Regimes, 28(164) POLAR RECORD 23 (1992); Richard A. Caulfield, Food Security in Arctic Alaska:
Chapter 1: The Legal Protection of Subsistence

A substantial body of literature on the political and symbolic dimensions of the Alaska subsistence debate exists; however, other implications of the debate have not yet been explored, such as the relationship between subsistence and food security. We will demonstrate in this paper that the ability of Alaskan Inuit to pursue their subsistence activities is closely linked to their food security. We will argue, in other words, that even if it is essential to ensure that the Inuit have access to healthy marketed foods, such as fruits, vegetables, whole grain cereals, and dairy products, protecting their subsistence harvesting of renewable natural resources is a fundamental requirement for their food security as well. We will then analyze some of the effects of the subsistence debate and federal and state resources management regimes regarding Alaskan Inuit food security.

In Part II of this article, we describe briefly the genesis and the evolution of the subsistence debate in Alaska. We then attempt in Part III to demonstrate that the legal protection of subsistence is a prerequisite to Inuit food security for nutritional, cultural, and economic reasons. In Part IV, we identify specific features of the Alaskan legal regime that threaten Inuit subsistence and food security.

THE ENDURING CONFLICTS OVER SUBSISTENCE IN ALASKA

Alaska Natives have been struggling for the recognition of their rights, including land, hunting, fishing, and gathering rights, since at least 1867 when the United States purchased Russian interests in the territory that later became the State of Alaska. No treaty protecting Alaska Native rights has been reached with the United States. In fact, until 1971, when the Alaska Native Claims Settlement Act (ANCSA) was passed, the very existence of Alaska Native rights remained uncertain. Subsistence hunting and fishing rights were not comprehensively defined until the adoption of the 1980 Alaska National Interest Lands Conservation Act (ANILCA).

Native Subsistence Rights from Statehood to ANILCA

When Alaska was admitted as a state in 1959, the Alaska Statehood Act authorized the new-born state to select for development 103.35 million acres of ‘vacant, unappropriated, and unreserved’ public lands of the United States, representing about 28% of Alaska’s total land base. The Act also recognized the rights of Native peoples in the following terms:

_A Preliminary Assessment, in Sustainable Food Security in the Arctic: State of Knowledge_ 75, 8790 (Gérard Duhaime ed., 2002).

15. See generally CASE & VOLUCK, supra note 8, at 6–22.

16. See id. at 1617.

17. See id. at 290–91.

18. Alaska was formally admitted to the Union on January 3, 1959, after President Eisenhower signed the official proclamation pursuant to sections 1 and 8(c) of the Alaska Statehood Act, Pub. L. No. 85-508, 72 Stat. 339 (1958).


Arctic Food Security

As a compact with the United States said State and its people do agree and declare that they forever disclaim all right and title...to any lands or other property (including fishing rights), the right or title to which may be held by any Indians, Eskimos, or Aleuts (hereinafter called natives) or is held by the United States in trust for said natives.\textsuperscript{21}

However the Act did not define the title or rights that Natives might have, leaving this question in limbo.\textsuperscript{22} The State of Alaska and its Native peoples clashed when the state began to select lands and plan development projects that could interfere with subsistence activities.\textsuperscript{23} Native peoples claimed that the lands selected by the state were subject to aboriginal title and thus were not ‘vacant, unappropriated and unreserved.’\textsuperscript{24} They also challenged the state’s land selections before the federal Bureau of Land Management.\textsuperscript{25} In 1966, in response to Native protests, U.S. Secretary of the Interior, Stewart Udall, halted state land selections until Native claims were settled.\textsuperscript{26} The ‘land freeze’ was made permanent in 1968.\textsuperscript{27} However, the discovery of vast oil reserves at Prudoe Bay in 1967 and 1968 prompted the settlement of Native land claims.\textsuperscript{28}

\textsuperscript{21}Alaska Statehood Act § 4.
\textsuperscript{22}Id.
\textsuperscript{23}See BERGER, supra note 6, at 91.
\textsuperscript{24}Alaska v. Udall, 420 F.2d 938, 939 (9th Cir. 1969).
\textsuperscript{25}See id.
\textsuperscript{26}CASE & VOLUCK, supra note 8, at 156.
\textsuperscript{28}See CASE & VOLUCK, supra note 8, at 157; HAYCOX, supra note 10, at 83; NASKE & SLOTNICK, supra note 27, at 208. On April 1, 1970, the United States District Court for the District of Columbia granted a preliminary injunction restraining the issuance of right-of-ways permits for gravel haul roads and pipelines running across the lands claimed by Stevens Village, Hearing on Motion for Preliminary Injunction at 74, Native Vill. of Allakaket v. Hickel, No. 706-70 (D.D.C. 1970), after the Secretary of the Interior purported to modify the land freeze to make the issuance of such permits possible. Id. at 11. Initially, five Alaska Native villages claiming lands in the path of the pipeline and roadway projects sued to prevent the Secretary of the Interior from issuing permits without first obtaining the consent of their tribal officials. Id. at 7. The villages alleged that the Secretary of the Interior had statutory and regulatory obligations to secure their consent prior issuing the permits. Id. They also argued that this obligation flowed from the trusteeship relationship between the United States government and American Indians that obliged the United States to protect lands held by virtue of an Aboriginal title. Id. at 24. The court granted a preliminary injunction only to Stevens Village, organized under the Indian Reorganization Act of 1934 (IRA), after applying 25 U.S.C. § 324, which states that ‘[n]o grant of a right-of-way over and across any lands belonging to a tribe organized under the [IRA]... shall be made without the consent of the proper tribal officials.’ Id. at 74. It did not grant a preliminary injunction to Minto Village, the only other IRA village among the plaintiffs, as the road and pipeline were not to pass across
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To this end, Congress enacted ANCSA in 1971.29 The Act extinguished “[a]ll aboriginal titles, if any, and claims of aboriginal title in Alaska based on use and occupancy, including submerged land underneath all water areas, both inland and offshore, and including any aboriginal hunting or fishing rights that may exist”30 and all claims based on aboriginal rights and title.31 In exchange, the Act provided that Native regional and village for-profit corporations would receive $962.5 million in compensation32 and about forty-five million acres of land.33 In extinguishing aboriginal rights ANCSA did not provide for specific Native hunting, fishing, and gathering rights; however, the Conference Committee declared that it expected the State of Alaska and Secretary of the Interior to take any measures necessary to further the protection of subsistence.34 Unfortunately, both the Secretary and the state failed to meet Congressional expectations, and neither adopted comprehensive policies aimed at the protection of Natives’ subsistence.35 Hence, after ANCSA, subsistence remained virtually unprotected.36 Native peoples could only rely on specific exemptions provided in certain fish and game laws, such as the Migratory

its lands. Id. The court also refused to grant a preliminary injunction to Bettles, Rampart and Allakaket, villages not organized under the IRA and therefore not entitled to the guarantee provided in 25 U.S.C. § 324. See id. at 75.

31 Id. § 1603(c).
32 Id. § 1605.
33 Id. § 1611.
34 H.R. REP. NO. 92–746, at 4 (1971), reprinted in 1971 U.S.C.C.A.N. 2247, 2250. Congress was well aware that subsistence would need further protection. See id. The Senate final version of the claims settlement bill included a provision directing the Secretary of the Interior to protect subsistence uses on public lands. See id. The provision was not retained by the conference committee. Id. The committee's awareness of the necessity of providing further protection for subsistence, however, is confirmed by the following excerpt from its report:

The Senate amendment to the House bill provided for the protection of the Native peoples' interest in and use of subsistence resources on the public lands. The conference committee, after careful consideration, believes that all Native interests in subsistence resource lands can and will be protected by the Secretary through the exercise of his existing withdrawal authority. The Secretary could, for example, withdraw appropriate lands and classify them in a manner which would protect Native subsistence needs and requirements by closing appropriate lands to entry by non-residents when the subsistence resources of these lands are in short supply or otherwise threatened. The Conference Committee expects both the Secretary and the State to take any action necessary to protect the subsistence needs of the Natives. Id.

35 CASE & VOLUCK, supra note 8, at 283.
36 Id.
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Bird Treaty Act (MBTA),\textsuperscript{37} the Marine Mammal Protection Act of 1972 (MMPA),\textsuperscript{38} and the Endangered Species Act of 1973 (“ESA”).\textsuperscript{39}

\textsuperscript{37} 16 U.S.C. §703 (2000), \textit{amended by} Migratory Bird Treaty Reform Act of 2004, Pub. L. No. 108-447, 118 Stat. 2809, 3071 (2004). This statute, as amended, implements the provisions of four international conventions regarding migratory birds and makes it illegal to take, possess or sell migratory birds, their parts, or their eggs. \textit{Id.} Originally, treaties between the United States and Canada and the United States and Mexico prohibited migratory bird harvests from March 10 through September 1. Convention between the United States and Great Britain for the Protection of Migratory Birds, Aug. 16, 1916, U.S.Gr.Brit. art. II, 39 Stat. 1702, 1703; Convention between the United States of America and Mexico for the Protection of Migratory Birds and Game Mammals, Feb. 7, 1936, U.S.Mex. art. II, 50 Stat. 1311, 1313. These treaties ignored the fact that Alaska Natives traditionally harvest migratory birds during these months as an important part of their diet. \textit{Id.} Treaties with Japan and Russia, however, created exceptions to the closed season for Native peoples of Alaska. Protection of Birds and Their Environment, Mar. 4, 1972–Sept. 19, 1974, U.S.–Japan, art. III, 25 U.S.T. 3329; Conservation of Migratory Birds and Their Environment, Nov. 19, 1976, U.S.–U.S.S.R., art. II, 29 U.S.T. 4647. In \textit{Alaska Fish and Wildlife Federation and Outdoor Council, Inc. v. Dunkle}, 829 F.2d 933 (9th Cir. 1987), the Ninth Circuit Court of Appeals held that "[t]he Unites States–Canada Convention is the most restrictive of the four treaties, and all of the Secretary's regulations must be in accord with that treaty." \textit{Id.} at 941. Thus, it was not possible for Congress to implement the more liberal provisions of the Russian treaty until the Canadian and Mexican conventions were amended to permit spring and summer subsistence hunting of migratory birds. \textit{See id.} at 94142. The treaties with Canada and Mexico were later amended to provide such an exception for the ‘indigenous inhabitants’ of Alaska. Protocol Amending the 1916 Convention for the Protection of Migratory Birds, Dec.14, 1995, U.S.–Can., art. II, para. 4. S. TREATY DOC. NO. 23–36. The exception has been integrated into the MBTA in the following terms:

\begin{quote}
In accordance with the various migratory bird treaties and conventions with Canada, Japan, Mexico, and the Union of Soviet Socialist Republics, the Secretary of the Interior is authorized to issue such regulations as may be necessary to assure that the taking of migratory birds and the collection of their eggs, by the indigenous inhabitants of the State of Alaska, shall be permitted for their own nutritional and other essential needs, as determined by the Secretary of the Interior, during seasons established so as to provide for the preservation and maintenance of stocks of migratory birds.
\end{quote}


\textsuperscript{38} 16 U.S.C. §§ 1361 \textit{et seq.} (2000). Section 1371(b) provides that the moratorium on the taking of marine mammals shall not apply to any Indian, Aleut, or Eskimo who resides in Alaska and who dwells on the coast of the North Pacific Ocean or the Arctic Ocean if such taking–(1) is for subsistence purposes; or (2) is done for purposes of creating and selling authentic native articles of handicrafts and clothing ... and (3) in each case, is not accomplished in a wasteful manner.

\textit{Id.} at § 1371(b).
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The Enactment of ANILCA and the Ensuing Subsistence Debate

Congress passed ANILCA in 1980, recognizing, among other things, that the congressional expectations of 1971 had not been realized. ANILCA first aimed at the creation of more than 140 million acres of conservation system units, principally national parks and preserves, national forests, and wildlife refuges. ANILCA also purported to protect the subsistence way of life of rural residents, who are predominantly Native. This goal was affirmed in Congress’ declaration of findings, which recognized that ‘the continuation of the opportunity for subsistence uses by rural residents of Alaska, including both Natives and non-Natives, on the public lands and by Alaska Natives on Native lands is essential to Native physical, economic, traditional, and cultural existence and to non-Native physical, economic, traditional and social existence.’

Recognizing the link between subsistence and food security, Congress also stated that “in most cases, no practical alternative means are available to replace the food supplies and other items gathered from fish and wildlife which supply rural residents dependent on subsistence uses.”

In response to those findings, Congress enacted a priority for the taking of fish and wildlife on public lands for nonwasteful subsistence uses over other uses, such as the taking of fish and game for recreational and commercial purposes.

‘Subsistence uses’ are defined in ANILCA as:

the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.

Whenever the resources are so scarce that restrictions among subsistence users are required, Congress directed that limitations should be based on the following criteria: ‘(1) customary and direct dependence upon the populations as the mainstay of livelihood; (2) local residency; and (3) the availability of alternative resources.’

39. 16 U.S.C. §§ 1531 et seq. (2000). This Act exempts Alaska Natives and non-Native permanent residents of an Alaska Native village from the prohibition on taking endangered species when such taking is done for subsistence purposes. See id. at § 1539(e). Further, non-edible byproducts of the endangered species “may be sold in interstate commerce when ‘made into authentic native articles of handicrafts and clothing.’” Id.


41. Case & Voluck, supra note 8 at 283.


43. Id. § 3101(c).

44. Id. § 3111(1).

45. Id. § 3111(2).

46. Id. § 3114.

47. Id. § 3113.

48. Id. § 3114.
The priority only applies to subsistence activities when exercised on public lands, waters, or interests therein owned by the federal government, representing about 65% of the state’s total area.\(^{49}\) To avoid duplicating management systems and to allow the state to exercise management authority over its entire territory, ANILCA provides that Alaska may obtain subsistence jurisdiction of federal lands upon passage of a law providing for a similar subsistence priority for rural residents.\(^{50}\) Alaska adopted such a law in 1978 and was therefore granted jurisdiction over fishing and hunting activities throughout the state.\(^{51}\)

In 1989, after ten years of state control, the Supreme Court of Alaska found the state law granting the rural priority unconstitutional because of its inconsistency with the strict equal-access clauses of the Alaska Constitution.\(^{52}\) Following this ruling, the supreme court held that all Alaskans were eligible for the subsistence priority.\(^{53}\) At that point, the state was no longer in compliance with ANILCA\(^{54}\) and could not comply without either amending its constitution to allow for the recognition of a rural residence priority or securing an amendment to ANILCA that would eliminate the rural residence requirement. Alaska took neither of these actions, so the federal government regained control of subsistence on federal lands in

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\(^{50}\) 16 U.S.C. § 3115(d).

\(^{51}\) During the discussions on ANILCA and in anticipation of the bill, the state enacted in 1978 a subsistence law providing for a subsistence priority over all other uses. ALASKA STAT. § 16.05.940 (1978) (current version at ALASKA STAT. § 16.05.930(e) (Michie 2004)). The state law did not identify who was a subsistence user. See ALASKA STAT. § 16.05.940(23) (1978). The priority benefited all residents, not just rural residents or Natives. See id. In order to conform to the rural priority requirement of ANILCA, the fish and game board adopted regulations in 1982 restricting the priority to rural residents; however, the Alaska Supreme Court quashed these regulations on the ground that the Alaska subsistence statute did not authorize the board to restrict the benefit of the subsistence priority to rural residents. Madison v. Alaska Dep’t of Fish & Game, 696 P.2d 168, 176 (Alaska 1985). To comply with ANILCA and avoid a federal takeover of fish and game management on federal lands, the state amended the subsistence statute in 1986 to limit the subsistence priority to rural residents. ALASKA STAT. § 16.05.258(c) (1986) (amended 1992); § 16.05.940(30) (current version at § 16.05.940(33) (Michie 2004)).

\(^{52}\) McDowell v. State, 785 P.2d 1, 10–11 (Alaska 1989). Several sections of article VIII of the Alaska Constitution prevent the creation of special rights or privileges regarding access to natural resources. See ALASKA CONST. art. VIII, § 3 (reserving naturally occurring fish, wildlife, and waters to the people for common use); id. § 15 (prohibiting the creation of exclusive rights or access privileges to fisheries); id. § 17 (declaring that ‘[l]aws and regulations governing the use or disposal of natural resources shall apply equally to all persons similarly situated with reference to the subject matter and purpose to be served by the law or regulation’).


\(^{54}\) Id. at 364.
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1990\textsuperscript{55} and in some waters in 1999.\textsuperscript{56} Since then, subsistence hunting and fishing activities have been governed by two separate legal systems, depending on ownership of the land.\textsuperscript{57} ANILCA governs subsistence for ‘rural residents’ on federal lands;\textsuperscript{58} state law governs subsistence for ‘all Alaskans’ on state and private lands (including Native-owned ANCSA lands).\textsuperscript{59}

The state revised its subsistence law in 1992 in reaction to \textit{McDowell v. State} and to the political deadlock over potential constitutional amendments.\textsuperscript{60} The statute continues to grant subsistence uses a priority over other uses;\textsuperscript{61} however, unlike ANILCA, the act does not define subsistence uses in relation to rural residency.\textsuperscript{62} Thus, the priority applies to all Alaska residents, whether rural, suburban, or urban.\textsuperscript{63} State law does distinguish among users in times of scarcity, when the harvestable portion of resources is not sufficient to satisfy all subsistence users.\textsuperscript{64} In such cases, limitations on access to fish and game can be imposed based on the customary and direct dependence of the subsistence user on the fish or game populations as well as the ability of the subsistence user to obtain food if subsistence use is regulated or

\begin{itemize}
\item 56. Subsistence Management Regulations for Public Lands in Alaska, Subparts A, B, C, and D, Redefinition to Include Waters Subject to Subsistence Priority; Final Rule, 64 Fed. Reg. 1276 (Jan. 8, 1999).
\item 57. \textsc{Case \\& Voluck, supra} note 8, at 302.
\item 58. \textit{Id.}
\item 59. \textit{Id.} at 301.
\item 60. \textsc{Alaska Stat.} \S 16.05.258(c) (Michie 2004).
\item 61. \textit{Id.} at \S 16.05.258.
\item 62. \textit{Id.}
\item 64. \textsc{Alaska Stat.} \S 16.05.258(b)(4) (Michie 2004)
\end{itemize}
eliminated. To alleviate the pressure on resources that would result from a potential subsistence priority afforded to all Alaska residents, the statute also requires the fish and game board to identify ‘non-subsistence area’ where no priority applies. A non-subsistence area is defined as ‘an area or community where dependence upon subsistence is not a principal characteristic of the economy, culture, and way of life of the area or community.’ In those areas, subsistence users can fish and hunt under ‘personal use’ or sport regulations. They will have to compete directly with all other users, however, to fulfill their subsistence needs.

Over the last twelve years, several attempts have been made to amend the Alaska Constitution in order to grant rural residents a priority for the subsistence use
of resources and to resume state jurisdiction over the entire state.\(^{70}\) All legislative efforts to advance ballot measures for a public vote to amend the state constitution, however, have failed.\(^{71}\)

The political, practical, social, and symbolic implications of the subsistence debate have been discussed thoroughly in academic, political, and judicial forums.\(^{72}\) Little attention, however, has been paid to the specific relationship between this debate and the global challenge of food security.

**Subsistence as a Condition for Inuit Food Security**

The concept of food security, currently defined as the capacity of every individual to access sufficient, safe, and nutritious foods corresponding to their preferences,\(^ {73}\) has an objective as well as a subjective component. It is not enough that sufficient, safe and nutritious food supplies be *available*; they must also be *accessible* to every individual.\(^ {74}\) Food security also requires that people have access to *adequate* foods.

\(^{70}\) E.g., H.J. Res. 41, 22d Leg., 2d Sess. (Alaska 2002).

\(^{71}\) *Alaska Natives Commission, Final Report, Volume III* 19–34 (Alaska 1994); Ryan T. Peel, *Katie John v. United States: Balancing Alaskan State Sovereignty with a Native Grandmother's Right to Fish*, 15 BYU J. PUB. L. 263, at 278. On February 15, 2002, Governor Knowles proposed a constitutional amendment to the Alaska legislature that would have permitted the adoption of a rural priority. H.J. Res. 41, 22d Leg., 2d Sess. (Alaska 2002). This proposal was drafted by a working group established after the conclusion of the Subsistence Leadership Summit, held in August 2001. *Id.* In addition to permitting a rural subsistence priority, the amendment would have extended a subsistence priority to residents of urban areas who could show traditional and customary use of the resources. *Id.* Ultimately, however, the amendment failed. See *Stenace Management Information, Management History*, available at [http://www.subsistmgtinfo.org/history.htm](http://www.subsistmgtinfo.org/history.htm) (last visited Feb. 9, 2005).


\(^{73}\) *World Food Summit Plan of Action*, supra note 4, ¶ 1.

\(^{74}\) *Id.*
notably, foods ‘corresponding to the cultural traditions of the people to which the consumer belongs.’ The requirement of cultural acceptability ‘implies the need also to take into account, as far as possible, perceived non nutrient-based values attached to food and food consumption.’ It recognizes that ‘food culture’ is part of a group’s wider cultural identity. As such, food security amounts to the practical objective of the ‘right to food’ protected under international law, specifically, the right to adequate food affirmed in section 11 of the International Covenant on Economic, Social and Cultural Rights. The United Nations Special Rapporteur on the Right to Food interprets this right as:


76. General Comment 12, supra note 70, ¶ 11.


78. Section 11 of the International Covenant on Economic, Social and Cultural Rights provides:

1. The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions. The States Parties will take appropriate steps to ensure the realization of this right...

2. The States Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international cooperation, the measures, including specific programmes, which are needed...

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the right to have regular, permanent and free access, either directly or by means of financial purchases, to quantitatively and qualitatively adequate and sufficient food corresponding to the cultural traditions of the people to which the consumer belongs, and which ensures a physical and mental, individual and collective, fulfilling and dignified life free of fear.\footnote{Report by the Special Rapporteur, supra note 70, ¶ 14.}

As we will explain in the following sections, Inuit subsistence activities and foods\footnote{80. These foods, commonly called ‘subsistence’ or ‘Native’ foods in Alaska, see Caulfield, supra note 12, at 83, will hereinafter be called ‘country foods.’ We use this term to refer to fish, game and plants harvested locally by Inuit people. ‘Country foods’ are the opposite of food products imported from the south and sold on Arctic markets, which will hereinafter be called ‘market foods.’} are not valuable merely from a nutritional and health perspective. They also correspond to the food preferences of a large number of Alaskan Inuit and promote both the cultural vitality and the food economy of Inuit communities.

Country Food Gathered Through Subsistence Activities is Significant in Alaska Native Food Preferences and Diet

A gradual shift in the Inuit diet and increasing dependence on a more ‘Western’ diet has resulted from the progressive sedentarization of Inuit communities and the increasing availability of market foods. Nevertheless, foods surveys\footnote{It is worth noting that dietary surveys among Aboriginal people, especially among Eskimo populations, are not regularly conducted.} conducted among Alaska Native adults have revealed that “country foods” are still regularly consumed in Alaska.\footnote{81. See ALASKA NATIVE HEALTH BOARD & ALASKA NATIVE EPIDEMIOLOGY CENTER, FINAL REPORT ON THE ALASKA TRADITIONAL DIET SURVEY (2004), available at http://www.anhb.org/epicenter/pdf/traditional_diet.pdf (last visited Feb. 24, 2004); Elizabeth D. Nobmann, Diet Among Siberian Yup'iks of Alaska} In 2000, 92% of Alaskan Arctic households, the majority of

\footnotetext{79. Report by the Special Rapporteur, supra note 70, ¶ 14.}
which are Inuit, reported consuming local game, such as caribou, harbor and ringed seal, bowhead whale, walrus, ptarmigan, duck, and geese. Ninety-six percent of households reported consuming fish, most frequently salmon, halibut, whitefish, and herring. The market foods reported as most frequently consumed were coffee, sugar, white bread, tea, soft drinks, butter, and margarine. Studies have suggested that country food intake increases with age and varies geographically and seasonally.

This preference for country foods may be explained in several ways. For example, in investigating the factors influencing individual motivation to eat country foods, one study reported that the Inuit of Barrow believe their country foods are, among other things, nutritious, tasty, filling, natural, and part of who they are. The Inuit report craving country foods and state that it keeps them strong and warm.

The current state of knowledge tends to indicate that the consumption of country foods remains important for the health of Alaskan Inuit. The food security of the Inuit is favored by the consumption of traditional foods supplemented with nutritious foods obtained from the external food market. Country foods contain many key nutrients that contribute to individual health, and may lower the risk of heart disease, some cancers, diabetes, hyperinsulinemia, adverse birth outcomes, and atherosclerotic diseases. For example, numerous studies have reported that the Inuit traditional diet, rich in fish and marine mammals, protects against cardiovascular diseases. This benefit can be attributed to the n-3 fatty acids in aquatic country foods.


83. For the report, see ROBERT J. WOLFE, ALASKA DIV. OF SUBSISTENCE, SUBSISTENCE IN ALASKA: A YEAR 2000 UPDATE 2 (2000). For the variety of game, see Carole Blanchet et al., Diet Profile of Circumpolar Inuit, in SUSTAINABLE FOOD SECURITY IN THE ARCTIC 46, 50 (Gérard Duhaime ed., 2002).

84. WOLFE, supra note 78, at 2. See also Blanchet, supra note 78, at 50; Nobmann, supra note 77.

85. See Blanchet, supra note 78, at 50.

86. Id.


88. On Inuit preference for country foods, see Searles, supra note 77, at 64.

89. We refer to health in the holistic sense as defined by the Constitution of the World Health Organization of 1946: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” See WORLD HEALTH ORGANIZATION CONST. preamble, para. 2.

90. Blanchet, supra note 78, at 57.

91. Id. at 47.

92. Id.
foods. Preliminary data suggests that a high dietary intake of these fatty acids may also reduce the occurrence of some cancers, diabetes, hyperinsulinemia, and birth defects.

The Inuit regard a healthy lifestyle as closely linked to hunting, fishing, and gathering activities. In numerous Aboriginal populations, however, a more sedentary lifestyle, the result of urbanization and acculturation, seems to be associated with the increasing prevalence of obesity, diabetes, and some cardiovascular diseases. Fishing and hunting activities provide an opportunity for the Inuit to increase physical activity, maintain normal weight, and prevent metabolic disorders, in addition to providing various significant social and cultural benefits.

The risks related to Inuit consumption of country foods are mainly attributable to the presence of contaminants in these foods, primarily heavy metals and organochlorines, from exposure to various zoonotic diseases, and food poisoning. The contamination of the arctic food chain has been identified and investigated in great depth over the past two decades. While the level of contaminants in some traditional foods in other circumpolar regions approaches or exceeds national safety standards.

93. Id.; see also Donald A. Boudreau et al., Meeting Report of Arctic Native Atherosclerosis and Omega-3 Fatty Acids, 52 ARCTIC MEDICAL RESEARCH 73 (1993); Éric Dewailly et al., Relations Between N-3 Fatty Acid Status and Cardiovascular Disease Risk Factors Among Quebeckers, 74(4) AM. J. CLIN. NUTR. 603 (2001); John P. Middaugh, Cardiovascular Deaths Among Alaskan Natives, 1980–1986, 80(3) AM. J. PUB. HEALTH 282 (1990).

94. See, e.g., Blanchet et al., supra note 78, at 57; Cylla E. Friedberg et al., Fish Oil and Glycemic Control in Diabetes, 21 DIABETES CARE 494 (1998); Daan Kromhout, The Importance of N6 and N3 Fatty Acids in Carcinogenesis, 7 MED. ONCOL. TUMOR PHARMACOTHER 173, 173 (1990); Sjúrður F. Olsen et al., Does Fish Consumption During Pregnancy Increase Fetal Growth?, 9(4) INT. J. EPIDEMIOLOGY 971 (1990).


standards, data available\textsuperscript{100} for Alaska suggests that exposure levels to methylmercury are, for the most part, below or near WHO intake guidelines.\textsuperscript{101} Despite knowledge of contaminant levels in country food species, no known adverse human health effects have been observed in the Alaskan Arctic.\textsuperscript{102}

Recent dietary studies suggest that market foods are also important to the Inuit diet even though country foods provide many key nutrients. The adequate consumption of nutritious market foods, such as dairy products, fruits, vegetables, whole-grain cereals, fortified milk formulas, and iron-fortified cereals for infants, could prevent nutritional deficiencies among some sub-groups of the Alaska Arctic population.\textsuperscript{103} Substituting market foods for country foods, however, is not always desirable, because of the high fat and sugar content of market foods.\textsuperscript{104} The exercise of balancing or weighing the known risks and benefits of country food consumption is complex. While contaminants found in northern country foods may pose potential public health risks, these foods constitute a valuable source of several key nutrients. Reducing country food consumption significantly would expose the Inuit to indirect risks caused by changes in diet, such as social and cultural disruption and chronic diseases such as diabetes, some cardiovascular diseases and cancers seen at higher levels in other populations.\textsuperscript{105} Considering all the factors involved and the uncertainty surrounding some relationships between contaminant exposures and health effects, it appears that the combined benefits of country food consumption and their related activities are greater than the known risk of exposure to contaminants and biological diseases that country foods may present.\textsuperscript{106}

\textsuperscript{100}In Alaska, information about human exposure to PCBs is scarce and little diet-related and methylmercury intake data are currently available.


\textsuperscript{102}Id.

\textsuperscript{103}See Blanchet et al., supra note 78, at 57.

\textsuperscript{104}See Blanchet, supra note 78, at 57; Judith Lawn & Neima Langner, Dep't of Indian and Northern Affairs, Air Stage Subsidy Monitoring Program, Final Report, Food Consumption Survey (1994); Nobman, The Diet of Alaska Native Adults, supra note 77, at 1026–28; Nobman, Dietary Intakes Among Siberian Yupiks, supra note 77, at 16–17.


\textsuperscript{106}See Blanchet, supra note 78, at 57; Kuhnlein, Arctic Indigenous Women, supra note 98, at 2509
Country Food Promotes Inuit Cultural Vitality

As previously stated, food security requires not only that individuals have access to foods that are good for their health, but also that those foods be culturally acceptable. Because of its cultural dimension, food security goes beyond the mere satisfaction of physical needs—it integrates the social and cultural symbolism of food, which determines what food is and which foods are appropriate for human consumption. Subsistence activities continue to shape the life of Alaskan Inuit communities, including their occupational structure and their material and spiritual culture, language, and discourse. Inuit derive their self-worth, individually and collectively, from traditions associated with hunting, fishing, and gathering. More than a mere means of obtaining the foodstuffs required for physical survival, these practices represent an important aspect of community integration.

Activities related to subsistence represent an important foundation for the social and economic organization of Inuit communities, based primarily on kinship. Moreover, traditions of sharing play an integral economic role in these communities, helping each individual, whether or not he practices subsistence


108. See BERGER, supra note 6, at 48–72 (chapter on subsistence); Caulfield, supra note 12, at 83–87 (‘Country foods (commonly called ‘subsistence’ or ‘Native’ foods in Alaska) are a major part of the diets of people living in Alaska’s Arctic (Wolfe 1996). Families consume bowhead whales, walrus, seals, fish, berries, waterfowl, caribou, moose, Arctic hares, and many other species. As noted above, these foods are important not only for their nutritional qualities but also for their connection to Inupiat identity dans a treasured way of life.’); NORMAN A. CHANCE, THE INUPIAT AND ARCTIC ALASKA 86–114 (1990) (chapter on social life); CHASE HENSEL, TELLING OUR SELVES. ETHNICITY AND DISCOURSE IN SOUTHWESTERN ALASKA 7–15, 103–113, 149–153 (1996); Searles, supra note 77, at 57 (‘The diverse forms of symbolic capital attributed to certain foods, their consumption, and their exchange in everyday life remain central to the ways in which Inuit relate to their colonial past and to a postcolonial present, an era in which caste-like relations and sentiments continue to deeply impact social experience.’).


110. See, e.g., ALASKA NATIVES COMM’N FINAL REPORT, supra note 66, at 3; Carole Lévesque et al., Between Abundance and Scarcity: Food and the Institution of Sharing Among the Inuit of the Circumpolar Region During the Recent Historical Period, in SUSTAINABLE FOOD SECURITY IN THE ARCTIC: STATE OF KNOWLEDGE, supra note 3, at 106–07.
activities, have access to the food he needs and the food that corresponds to his food preferences. 111

Subsistence activities create a space for learning and ensure the perpetuation of traditional knowledge. 112 This knowledge contributes to the food security of populations dependent on the harvesting of natural resources. The practice of subsistence activities embodies a set of knowledge founded on experience and experimentation as well as on beliefs dealing with every dimension of the subsistence way of life, including the management of the environment the characteristics of plant, game, and fish species hunting, fishing and navigation techniques and the preparation and conservation of food. 113

Ending or severely restricting traditional subsistence activities would deprive the Inuit of foods that are significant from a cultural standpoint, which in itself is a source of food insecurity. 114 Therefore, for cultural reasons, the legal protection of subsistence activities is a requirement of Inuit food security.

Subsistence is Important for the Food Economy of Alaskan Inuit Communities

Many studies have underscored the high cost of living in the Arctic, including the cost of imported food. 115 Because of the cost of market foods, customary institutions based on subsistence fishing, hunting, and gathering play an important part in the economics of food security in Alaska. Individuals count on networks of family and community members that make country foods available to those in the community who cannot hunt and fish themselves for financial, employment, age, or illness reasons. These networks existed before the increased access and availability of

111. See Alaska Native Subsistence and Fishing Rights: Hearing before the Senate Committee on Indian Affairs, 107th Cong. 3–6 (2002) (statement of Rosita Worl, Chair, Subsistence Committee, Alaska Federation of Natives).


114. See Duhaime & Godmaire, supra note 3, at 26.

imported food and have adapted to the new food supply. Today, they remain an important factor in social and family relations.

The customary country food distribution networks provide healthy and culturally-meaningful foods at a lower cost for most consumers than market food. Although efficient hunting and fishing requires sizeable investment on the part of the hunters themselves, the food obtained from these activities is redistributed among a larger number of individuals than is the case for imported food. Inuit systems of food production and distribution are characterized by a small proportion of households handling a majority of the harvests (often referred to as ‘superhouseholds’) and by extensive cooperation among households in the production of subsistence foods. For example, while 63% of households in the Arctic region of Alaska harvest game, a much higher proportion (92%) are actually given access to the game through traditional food circulation channels. The figures are similar with respect to fish, which is harvested by 78% of households and made available by family and community networks to 96% of households. In a study on the production and distribution of wild food in the Inupiat villages of Wales and Deering, researchers found that about 30% of the households accounted for 70% or more of the harvest, by weight. Country food therefore tends to be economically accessible to a greater number of people than imported food. Thus, at the household level, food security is fostered by traditional family and community networks whose continuing vitality is dependent on subsistence.

The viability of these traditional food circulation channels must be sustained. One way to accomplish this objective is to reinforce the mixed-economy bases of the Arctic by acknowledging the importance of hunting and fishing activities in the

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120. Dept of Fish and Game, supra note 103, at 1–4; Magdanz, supra note 110, at 3.

121. Wolfe, supra note 78, at 2.

122. Id.

123. Magdanz, supra note 110, at 58.

124. Id. at 16.
The economic significance of subsistence in Alaskan Arctic communities is perhaps best appreciated in the light of one study that suggested that replacing subsistence foods would have cost these communities between $30 and $50 million in 2000.126 In the context of a mixed-market subsistence economy, monetary income is also a condition for food security because income is essential both to purchase imported foodstuffs and to enable hunters to engage in hunting and fishing activities. Income is generated primarily from wage work associated with government activities, transfer payments, private enterprises, and commercial fisheries.127

When one considers the occupational structure and its relationship to securing food access and availability, the interconnection between the requirements of wage work (daily and weekly schedules, hourly pay, training and professional qualifications) and those of hunting, fishing, and gathering activities (financial needs for hunting/fishing gear, flexibility, climatic factors, seasonal migration of game) appears as the most relevant feature. The reconciliation of these spheres of economic activities reflects their interaction. Because the hunter needs cash for country food production, he will aim at getting part of this money from wage work and transfer payments. If one’s available cash is not sufficient, family and community solidarity networks will then come into action by providing the hunter with extra money devoted to the hunting and fishing party. In order to ascertain the conditions for food security in Arctic Alaska, one must adopt an integrated view of subsistence activities and the wage economy and consider them a single socio-economic reality.

We conclude that the consumption of subsistence foods is a pre-condition for Inuit food security. This security, and the capacity of Inuit people to pursue subsistence activities, is threatened by environmental pollution, reduced biodiversity, increased competition over access to fish and game, and disruptions caused by the exploitation of resources such as minerals, hydrocarbons, and hydro-electricity.128 The legal framework may substantially hamper the ability of Alaska Natives to access their traditional foods by, for example, forbidding or restricting fishing, hunting, and gathering activities, by failing to protect these activities from the adverse impact of economic development, or by prioritizing commercial and


126. WOLFE, supra note 78, at 2.

127. Caulfield, supra note 12, at 78; Chabot, supra note 125, at 92–93, 100–103. See also Gérard Duhaime et al., Food Consumption Patterns and Socio-economic Factors Among the Inuit of Nunavik, 41 ECOLOGY OF FOOD AND NUTRITION 91 (2002).

recreational uses of fish, game, and plants. Nevertheless, the law can also play a key role in protecting the sustainable access of Alaska Natives to their traditional foods by fostering availability, accessibility, and safe consumption. The legal protection of subsistence must therefore be part of a comprehensive strategy for food security among the Inuit people of Alaska.

PROTECTING SUBSISTENCE-BASED FOOD SECURITY: THE SHORTCOMINGS OF ALASKAN LAW

As defined by the 1996 World Food Summit, sustainable food security refers to the ability of every individual to access sufficient, safe, and nutritious food adapted to her or his preferences. Such ability must be ‘maintained and reproduced, thanks to a strong resistance to fluctuations in the components of the food system.’ This goal can only be achieved when every individual possesses the means to obtain sufficient food, including the materials, labor power, and legal entitlements necessary to access food, which are maintained and reproduced over time. A complete assessment of the ‘subsistence security’ provided by a given legal regime would require the evaluation of several institutions governed by various legal disciplines. This paper, however, only focuses on a few specific issues that are particularly pressing from a food security perspective.

130. Id. In recent years, social scientists have increasingly recognized the role of law in achieving food security. Thus, Duhaime and Godmaire's integrated conceptual framework of sustainable food security illustrates how law, along with other factors such as the environment, demography, technology, economics, and politics, influences the means of production and circulation, as well as the availability, accessibility and consumption, of food. Id. See also Ghislain Otis, Inuit Subsistence Rights Under the James Bay and Northern Quebec Agreement: A Legal Perspective on Food Security in Nunavik, in SUSTAINABLE FOOD SECURITY IN THE ARCTIC: STATE OF KNOWLEDGE, supra note 3, at 189, 192–194; Statement of Rosita Worl, supra note 104, at 1.
131. See WORLD FOOD SUMMIT, supra note 4, at ¶ 1.
132. Duhaime & Godmaire, supra note 3, at 32.
133. The entitlement approach was developed by Amartya Sen. ‘The entitlement approach to starvation and famines concentrates on the ability of people to command food through the legal means available in the society, including the use of production possibilities, trade opportunities, entitlements vis-à-vis the state, and other methods of acquiring food.’ AMARTYA SEN, POVERTY AND FAMINES: AN ESSAY ON ENTITLEMENT AND DEPRIVATION 45 (1982). Hunting, fishing and gathering rights are entitlements under Sen's theory of famines. Id. at 51.
135. For a short discussion of some of the legal conditions for the protection of subsistence, see Thériault & Otis, supra note 3.
In Alaska, the subsistence debate and related issues show that the ability of Inuit peoples to access subsistence foods is precarious. The various facets of the debate, and its effect on Inuit food security, cannot be understood fully without a concurrent understanding of the geographic and demographic characteristics of Alaska. Alaska is the largest American state, comprising approximately 585,000 square miles. It is sparsely populated; roughly 635,000 people make their homes there, of which 16% are Alaska Natives. About 80% of the total population live in urban areas. The remaining 20% of Alaskans live in rural areas, spread in about 225 communities of less than 500 inhabitants. Most of those communities are not connected by road; food supplies are shipped by air or by sea. About half of the rural population are Alaska Native peoples, and in some areas Native peoples constitute a great majority of the population. For example, the population of Arctic Alaska is 56.2% Inuit in the North Slope Borough Area, 80.7% Inuit in the Nome census area, 87.1% Inuit in the Northwest Arctic Borough, and about 95% Inuit in the St. Lawrence Island.

As will be shown in the following sections, several aspects of Alaska law tend to make Inuit subsistence activities insecure or unsustainable, thus threatening Inuit food security.

Legal Confusion Generated by Dual Land Management

Since the McDowell ruling that declared the rural priority unconstitutional under state law, Alaska subsistence hunting and fishing activities are regulated by a highly complex and confusing jurisdictional system. In July 1990, because the state was no longer in compliance with ANILCA, the federal government took over the management of subsistence activities on federal lands. The United States has authority over subsistence activities exercised on federal lands, which comprise

138. Id.
139. Id.
140. Id.
141. Id.
143. Id. at 77; see also Wolfe, supra note 78, at 1.
144. Caulfield, supra note 12, at 76.
about 59% of Alaska’s total land surface.\textsuperscript{147} The U.S. also has jurisdiction over ‘reserved waters’ in which it has an interest by virtue of the reserved water rights doctrine.\textsuperscript{148} Reserved waters are waters adjacent to or running through federal lands ‘reserved’ for uses related to the federal lands.\textsuperscript{149} As for the state, it has jurisdiction over its lands as well as on private lands, including the ones owned by the Native corporations.\textsuperscript{150} State laws and regulations that deal, for example, with hunting and fishing methods also apply on federal lands when not preempted by Congress.\textsuperscript{151} State lands represent approximately 28% of the territory, while private owners, mainly Native corporations, have title to around 13% of the land base.\textsuperscript{152} The ANILCA subsistence priority does not apply on the lands that have been selected by the Native corporations,\textsuperscript{153} which are often the most important for subsistence hunting and fishing by Natives.

The current land management regime can be confusing, rendering hunting and fishing rights uncertain. First, the boundaries separating federal, state, and private

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\textsuperscript{147}16 U.S.C. § 3102(1)–(3) (2000); \textsc{case \& voluck, supra} note 8 at 292; Caulfield, \textit{supra} note 12, at 88.
\textsuperscript{148}Katie John v. United States, 247 F.3d 1032, 1034 (9th Cir. 2001) (en banc).
\textsuperscript{149}\textit{See} Alaska v. Babbitt, 72 F.3d 698, 704 (1995); \textsc{john, 247 F.3d} at 1033.
\textsuperscript{150}\textsc{case \& voluck, supra} note 8 at 301–302. \textit{See also} Kancewick \& Smith, \textit{supra} note 8, at 672; \textsc{wolfe, supra} note 78, at 4.
\textsuperscript{151}36 C.F.R. § 242.14; 50 C.F.R. § 100.14(a) (2005). These provisions read as follows: ‘State fish and game regulations apply to public lands and such laws are hereby adopted and made a part of the regulations in this part to the extent they are not inconsistent with, or superseded by, the regulations in this part.’ As explained in Totemoff v. State, 905 P.2d 954 (Alaska 1995), \textit{cert. den.} 517 U.S. 1244 (1996):
\textit{Federal law can preempt state law in three ways. First, Congress may expressly declare that state law is preempted. Second, state law is preempted if Congress intends the federal government to occupy a field exclusively. Third, federal law preempts state law if the two actually conflict. Id. at 958.}
\textit{In Totemoff, the Supreme Court of Alaska first noted that ‘no provision in ANILCA expressly preempts state enforcement of state hunting laws against subsistence hunters on federal land.’ Id. The court then stated that ANILCA does not disclose a ‘clear and manifest purpose’ to exclusively occupy the field of regulation of subsistence hunting on federal land, a jurisdiction traditionally exercised by the states. Id. at 959. Thus, the state can regulate subsistence hunting on federal land as long as its regulations do not conflict with federal law. Id. Finally, the Court held that there is ‘no direct conflict between Alaska's anti-spotlighting regulations and any federal statute or regulation.’ Id. at 960. For a comment on this case, see \textsc{shapiro, supra} note 67.}
\textsuperscript{152}Theresa Hull \& Linda Leask, \textit{Dividing Alaska, 1867–2000: Changing Land Ownership and Management}, 32(1) \textsc{alaska review of social and economic conditions} 1 (2000).
\textsuperscript{153}\textsc{case \& voluck, supra} note 8, at 301–302.
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lands are not clearly marked.154 Jurisdictional borders have become even more blurred since the Ninth Circuit Court of Appeals held in Alaska v. Babbitt155 that federal jurisdiction extends to reserved waters in which the United States has an interest by virtue of the reserved water rights doctrine.156 These waters can include those that are adjacent to federal conservation unit lands.157 Unclear boundaries combined with major differences in federal and state regimes generate confusion.158 Subsistence users, for instance, are not necessarily the same people under the federal and state schemes and do not have priority at same time and place under state and federal law.159 Under state law, all Alaska residents can qualify as subsistence users; in contrast, under ANILCA, only people residing in rural communities and making traditional and customary uses of fish and game resources can benefit from the priority.160

Moreover, management dualism sometimes results in conflicting federal and state regulations that apply to the same species. The effects of incompatible or contradictory regulations are particularly important when migratory species like caribou, moose, and salmon are concerned. Migratory animal populations will be subject to either federal or state regulations in the course of their movements over the jurisdictional checkerboard.161 This situation is detrimental to the enforcement of

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156. Babbitt, 72 F.3d at 70304.

157. See 50 C.F.R. § 100.3(b) (2000).


159. For example, moose hunting is subject to incompatible state and federal regulations regarding seasons in management unit 23, located in the Northwest region of Alaska. Under the federal regulations, subsistence users are allowed to hunt from July 1 to March 31; in contrast, a state subsistence user can harvest moose only until December 31. Compare 50 C.F. R. § 100.26(23) (2005) to 5 ALASKA ADMIN. CODE tit. 5, § 85.045 (2005). On July 13, 2004, the state issued an emergency order under the authority of ALASKA STAT § 16.05.060 (Michie 2000) restricting moose hunting seasons in a portion of game management unit 23 to August 1 through August 15 and December 1 through December 31, 2004, for residents who had registered to participate between June 1 and July 15. The State justified the emergency order by citing a decrease in the moose population. Similar restrictions, however, were not enacted on federal lands in the same management unit. These conflicting regulations resulted in great confusion for local users and were discussed extensively during the Northwest Arctic Regional Advisory Council meeting held October 8, 2004 in Kotzebue.


161. ALASKA DEPARTMENT OF FISH AND GAME, supra note 154, at; Caulfield, supra note 12, at 27; MAGDANZ, supra note 110, at 105–111.
regulations and decreases user compliance, thus hampering the sound management of fish and game resources upon which the very availability of food depends.  

The conflicts and confusion resulting from this management system are somewhat eased by the efforts made by the federal and the state agencies to coordinate their actions. Dual management between the state and federal agencies is currently guided by an Interim Memorandum of Agreement (MOA). Specific protocols are developed under the MOA to provide guidelines for the management of various resources or areas. Despite the fact that these protocols may help to minimize disruptions and duplication of efforts by state and federal managers, they do not provide for the certainty and stability required for the achievement of food security. While the protocol system provides a framework to foster coordinated subsistence management, it does not guarantee that the parties will systematically reach an agreement on the management of a particular resource. In certain cases, concessions in federal subsistence regulations that adjust for state law might be overturned in federal court if the result does not provide subsistence users with meaningful preferences.

162. ALASKA DEPARTMENT OF FISH AND GAME, supra note 154; HUNTINGTON, supra note 129, at 62, 94–98.
165. For example, the Yukon River Drainage Subsistence Salmon Fishery Management Protocol expressly states that ‘if federal and state managers cannot reach consensus on in season management decisions and these differences cannot be reconciled, the respective agencies may implement actions in accordance with their agency’s mandates and applicable regulations for waters under their respective jurisdictions.’ Id.
166. See, e.g., Ninilchik Traditional Council v. United States, 227 F.3d 1186 (9th Cir. 2000). One of the issues raised in the case was ‘whether the advance harvest season open only to subsistence hunters qualifies as a meaningful preference.’ Id. In game management units (GMU) 15B and 15C, the Subsistence Board authorized a harvest season running from August 10, 1995, through September 20, 1995, with the first ten days being reserved for subsistence use hunts. Id. at 1190. For GMU 15A, however, the Board adopted a harvest season running from August 18 to September 20, reserving only the first two days for subsistence hunters. Id. The federal government explained that the shortness of the advance season in GMU 15A was motivated by its desire ‘to prevent conflict with a state-regulated nonsubsistence bow-and-arrow hunt which runs from August 10 through August 17.’ Id. at 1195. The court ruled that the government (1) restricted the harvesting of moose for subsistence uses in order to give preference to non-subsistence hunting in violation of the plain language of § 3114 and (2) failed to provide any evidence to support a finding that the two-day advance season provides subsistence hunters with meaningful preferences. Id. Therefore, the court rejected ‘as arbitrary and capricious the Board’s determination that the
Defective or Limited Subsistence Priority

The criteria used to determine the priority for subsistence uses of fish and game represent another feature of the Alaskan legal regime that limits the ability of Inuit peoples to access their traditional foods, as they increase competition for fish and game. Such competition, to a great extent, is attributable to the inability of the state of Alaska to implement the rural priority provided in ANILCA. This federal statute recognizes a rural resident’s priority for subsistence hunting and fishing activities on lands belonging to the federal government.167 The Federal Subsistence Board determines which areas are rural by applying guidelines found in regulations.168 A community or area of 2,500 residents or less is deemed rural unless it has significant characteristics of a non-rural nature, or is considered socially and economically part of an urbanized area.169 Communities of 7,000 residents or more are presumed non-rural ‘unless such a community or area possesses significant characteristics of a rural nature.’170 The status of communities with a population between 2,500 and 7,000 is determined by evaluating community characteristics.171 Characteristics the Federal Subsistence Board may use to determine if a community or an area shall be considered rural or urban include, but are not limited to, the intensity of the use of fish and game by its residents, the development and diversity of the economy, the development of community infrastructures, means of transportation, and educational institutions.172 Applying these criteria, the Board has determined that Adak, Fairbanks North Star Borough, Homer area, Juneau area, Kenai area, Ketchikan area, Anchorage, Seward area, and Wasilla area are urban.173 Rural determinations are reviewed every ten years.174

State law also relies upon the federal criteria for determining the nature of an area to define the extent of its priority for the subsistence use of the resources, although in a different manner. In McDowell v. State,175 the Alaska Supreme Court held that under the Alaska Constitution it is unlawful to recognize a subsistence priority to citizens on the basis of residency.176 In 1992, in order to reduce the pressure on resources that resulted from the McDowell ruling, the Board of Fish and Game designated ‘non-subsistence areas,’ or areas of state or private lands where subsistence activities are not permitted.177 A non-subsistence area is defined as ‘an area or community where dependence upon subsistence is not a principal

advance hunting season in GMU 15A qualifies as a priority within the meaning of § 3114.’ Id. at 1195–96.
168.36 C.F.R. § 242.15.
169.§ 242.15 (a)(1).
170.§ 242.15 (a)(3).
171.§ 242.15 (a)(2).
172.§§ 242.15(5)(i)–(v).
173.§ 242.23.
174.§ 242.15(7).
175.785 P.2d 1 (Alaska 1989).
176.Id. at 9.
177. See ALASKA STAT. § 16.05.258 (C) (Michie 2004).
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classic of the economy, culture, and way of life of the area and community.\footnote{178} To determine whether such dependence is characteristic of a specific area or community, the Board applies various criteria to assess the relative importance of subsistence.\footnote{179} Thus, under state law, portions of the following areas have been found to be non-subsistence areas: Ketchikan, Juneau, Anchorage-Matsu-Kenai, Fairbanks, and Valdez.\footnote{180}

Under the state system, all Alaska residents benefit from the subsistence priority in designated subsistence areas regardless of urban or rural residency.\footnote{181} Granting such a general preference to subsistence uses rather than primarily benefiting only rural residents has given rise to major competition for access to resources between residents of subsistence areas and urban residents who travel to subsistence areas to hunt and fish for "subsistence."\footnote{182} Urban hunters from Anchorage, for instance, can get a state subsistence permit and travel to a subsistence area northeast of the city to hunt Nelchina caribou near a Native village whose

\footnote{178}{Id.}

\footnote{179}{More precisely the statute provides that: [i]n determining whether dependence upon subsistence is a principal characteristic of the economy, culture, and way of life of an area or community under this subsection, the boards shall jointly consider the relative importance of subsistence in the context of the totality of the following socio-economic characteristics of the area or community: (1) the social and economic structure; (2) the stability of the economy; (3) the extent and the kinds of employment for wages, including full-time, part-time, temporary, and seasonal employment; (4) the amount and distribution of cash income among those domiciled in the area or community; (5) the cost and availability of goods and services to those domiciled in the area or community; (6) the variety of fish and game species used by those domiciled in the area or community; (7) the seasonal cycle of economic activity; (8) the percentage of those domiciled in the area or community participating in hunting and fishing activities or using wild fish and game; (9) the harvest levels of fish and game by those domiciled in the area or community; (10) the cultural, social, and economic values associated with the taking and use of fish and game; (11) the geographic locations where those domiciled in the area or community hunt and fish; (12) the extent of sharing and exchange of fish and game by those domiciled in the area or community; (13) additional similar factors the boards establish by regulation to be relevant to their determinations under this subsection. Id.}

\footnote{180}{ALASKA ADMIN. CODE tit. 5, § 99.015 (2005). The validity of this determination, including the inclusion of the Kenai Peninsula in the nonsubsistence areas has been confirmed recently. State v. Kenaitze Indian Tribe, 83 P.3d 1060 (Alaska 2004).}

\footnote{181}{CASE & VOLUCK, supra note 8, at 300–02.}

residents rely upon this species for subsistence.\textsuperscript{183} The Alaska Supreme Court ruled in \textit{State v. Kenaitze Indian Tribe}\textsuperscript{184} that the State may not give priority to residents of subsistence areas, even when the conservation of resources requires restricted access to fish and game.\textsuperscript{185} Applying the \textit{State v. McDowell} ruling, the court held that when subsistence resources become scarce, the state will only be allowed to restrict the taking of such resources in accordance with the following criteria: (1) the customary and direct dependence on the fish stock or game population by the subsistence user for human consumption as a mainstay of livelihood; and (2) the ability of the subsistence user to obtain food if subsistence use is restricted or eliminated.\textsuperscript{186} Limited resources, allocated among a potentially large group of people, threaten the capacity of local people to get all of the food they need from their traditional fishing and hunting grounds.\textsuperscript{187}

The capacity to access traditional foods over time can also be undermined because the special status of subsistence over other uses of fish and game, including commercial and sport uses, is so closely linked to the rural status of a region as defined by demographic and socio-economic criteria. For example, the economic development of a rural area resulting from the discovery and exploitation of non-renewable natural resources or tourism could have major consequences for local residents, who depend on the resources of the land to meet their food needs.\textsuperscript{188} Under federal law, a reclassification of an area or a community as non-rural would mean that its residents lose their subsistence priority.\textsuperscript{189} Under state law, the reclassification of a subsistence area as a non-subsistence area means that residents must travel to a subsistence area in order to benefit from the subsistence priority.

The alternative of remaining in the non-subsistence area would mean that the subsistence user would be forced to compete directly with commercial, sport, and

\begin{thebibliography}{99}
\item \textsuperscript{183} Morehouse & Holleman, \textit{supra} note 34, at 31–33.
\item \textsuperscript{184} 894 P.2d 632 (Alaska 1995).
\item \textsuperscript{185} See \textit{id.} at 637–39.
\item \textsuperscript{186} \textit{Alaska Stat.} § 16.05.258(b) (Michie 2004).
\item \textsuperscript{188} Summit, \textit{supra} note 179, at 637–42.
\item \textsuperscript{189} 16 U.S.C. § 3113 (2000); 36 C.F.R. § 242.15 (2005); Kenaitze Indian Tribe v. Alaska, 860 F.2d 312, 31314 (9th Cir. 1988).
\end{thebibliography}
personal uses of the resources.\textsuperscript{190} To oblige Native people to travel in order to exercise their hunting and fishing rights could also break their ancestral ties to their lands and result in the loss of the knowledge related to its current and past use.\textsuperscript{191}

\textbf{The Challenge of Accommodating Inuit Culture in the Subsistence Regime}

The ability of the Alaska legal regime to foster food security for the Inuit will also be contingent upon the extent to which it can accommodate the Inuit understanding of and concerns related to subsistence activities. Closely related to this issue is the relative control of Inuit peoples over the decision-making processes that affect their ability to secure subsistence foods.

The Inuit peoples often complain that the rules governing subsistence fail to acknowledge their traditions, customs, and beliefs.\textsuperscript{192} Subsistence processes are characterized by their flexibility, dynamism, and resiliency.\textsuperscript{193} Hunting, fishing, and gathering patterns have always been determined by factors such as availability, opportunity, and needs.\textsuperscript{194} They are also defined by the knowledge transmitted from generation to generation in the form of traditions, customs, and beliefs.\textsuperscript{195} An overly strict and inflexible system that fails to take into account the practical and historical

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\textsuperscript{190} State v. Kenaitze, 894 P.2d 632 (Alaska 1995); State v. Kenaitze, 83 P.3d 1060 (Alaska 2004). For an example of such a situation, read \textit{Kenaitze Indian Tribe}, 860 F.2d 312. It should be noted that the challenge concerned an Alaska law where Alaska was complying with ANILCA and was exercising its jurisdiction on the entire territory of Alaska. \textit{Id.} at 31314. However, the reasoning in this decision could be applied to the federal law. See \textit{Alaska Natives Commission}, \textit{supra} note 66, at 17.

\textsuperscript{191} Natasha Summit summed up the implication of the \textit{Kenaitze} decision this way:

\begin{quote}
We would be well reminded to accord the sentiments of Justice Matthews in McDowell that simply moving is not a viable option to achieve the rights of equal access. Although the Kenaitze are eligible for Tier I and II subsistence status, to truly preserve and perpetuate their cultural heritage of subsistence activities, they will have to become highly mobile, traveling hundreds of miles to other hunting and fishing grounds and encroaching upon the subsistence heritage of others. Kenaitze essentially commands the Tribe to uproot from Kenai Peninsula if they wish to continue their traditional ways. It is not inconceivable that the tremendous pressures upon the resources of the Kenai will significantly curtail the personal fish and game uses. If the Kenaitze are forced to move to achieve equal access, they will ultimately lose their ancestral ties to their fishing and hunting grounds, and possibly as an inevitable consequence, their fundamental eligibility for any subsistence status.
\end{quote}

Summit, \textit{supra} note 124, at 641–42.


\textsuperscript{193} HUNTINGTON, \textit{supra} note 129, at 5, 7–8, 11, 32–34; NUTTALL, \textit{supra} note 1076, at 79–80.

\textsuperscript{194} \textit{Id.}

\textsuperscript{195} Berger, \textit{supra} note 6, at 51–52; Caldwell, \textit{supra} note 184, at 63; HUNTINGTON, \textit{supra} note 129, at 7.
bases for subsistence patterns could jeopardize food security by dissolving the
cultural cloth into which subsistence practices are woven and thus impede the ability
of the Inuit to adapt to changing needs and environment. 196

The State’s regime with respect to the subsistence priority is too often
excessively rigid and does not adapt easily to the cultural, social, and nutritional
needs of local users. 197 The use of Euro-American wildlife management tools is not
always compatible with customary and traditional patterns of subsistence. 198 An
example frequently given is the inappropriateness of individual bag limits when meat
is shared among every member in the community. 199 In addition to threatening the
capacity of every individual in the community to get the food they need, rules that
are perceived as culturally inappropriate or which prevent users from meeting their
needs will often be ignored, ultimately thwarting conservation goals. 200 Thus, from a

196. NAVIGATING SOCIAL-ECOLOGICAL SYSTEMS. BUILDING RESILIENCE FOR
COMPLEXITY AND CHANGE 1–16 (Fikret Berkes et al. eds., Cambridge University
Press 2003). The concept of resilience focuses on ‘adaptive capacity for sustain-
ability.’ According to this concept ‘sustainability is viewed as a process, rather
than an end-product, a dynamic process that requires adaptive capacity in resil-
ient social-ecological systems to deal with change.’ Id. at 4. ‘Social-ecological
resilience is determined in part by the livelihood security of an individual or
group. Such security involves, according to Sen (1999), the questions of entitle-
ments and access to resources, the distribution of which is a key element of envi-
ronmental justice.’ Id. at 14. The authors also point out that ‘[a] resilient social-
ecological system, which can buffer a great deal of change or disturbance, is
synonymous with ecological, economic, and social sustainability.’ Id. at 15.

197. HUNTINGTON, supra note 129, at 94–100; MAGDANZ, UTERMOHLE &
WOLFE, supra note 110, at 105–24. See also Bobby v. Alaska, 718 F.Supp. 764
(D. Alaska 1989) (providing concrete examples); Kwethluk IRA Council v.

198. HUNTINGTON, supra note 129, at 95; Kancewick & Smith, supra note 8,
at 666; Alaska v. Kluti Kaah Native Village of Copper Center, 831 P.2d 1270,

199. ALASKA DEPARTMENT OF FISH AND GAME, supra note 146;
HUNTINGTON, supra note 129, at 95; Kancewick & Smith, supra note 8, at 666;
MAGDANZ, UTERMOHLE & WOLFE, supra note 110, at 109. As explained an In-
upiat elder, Robert Newlin, testifying before the State Board of Game: "The Ma-
jor and most fundamental difference of opinion we have with the proposed regu-
lations is the proposed limit of one caribou per hunter. It does not make sense to
an Iñupiaq community ... The Iñupiaq people's way of life has a heavy element
of sharing. The best hunters have killed more than they and their immediate
families need, and share what is left with relatives, older people, families with
sick and injured hunters, and others who need the meat. We certainly do not
want to lose the sense of community and helpfulness which our people share.”
(reproduced in MAGDANZ, UTERMOHLE & WOLFE, supra note 110, at 109).

200. MAGDANZ, UTERMOHLE & WOLFE, supra note 110, at 120;
HUNTINGTON, supra note 129, at 5, 98.; As Huntington puts it:

Because the need is more than merely nutritional, it is not simply a question of
ensuring that a certain number of seals and caribou can be taken. Requiring
Inupiaq hunters to obtain a tag before hunting brown bear does not allow hunters
food security as well as resource management perspective, legal schemes governing
the use of fish and wildlife must be responsive to local nutritional, cultural, and
spiritual needs and conditions.\textsuperscript{201} In other words, they must ‘become more
situationally relevant in rural areas.’\textsuperscript{202} The responsiveness of a management regime
to customary and traditional patterns of subsistence is measured by reference to such
factors as the mandate of governmental agencies and the participation of Native
users in the regulation-making process.\textsuperscript{203} The federal and state subsistence
management regimes differ greatly in those regards.\textsuperscript{204}

\textit{The responsiveness of the federal regime to Inuit cultural, spiritual, and nutritional
needs.} In general, the federal management system is more responsive than the state
system to the cultural, spiritual, and nutritional needs of subsistence users. This can
be first explained by the specific mandate of federal agencies under ANILCA ‘to
provide the opportunity for rural residents engaged in a subsistence way of life to
continue to do so.’\textsuperscript{205} Furthermore, in its declaration of findings Congress affirmed:

\begin{quote}
\textit{In order to fulfill the policies and purposes of the Alaska Native Claims Settlement Act and as a matter of equity, it is necessary for the Congress to invoke its constitutional authority over Native affairs and it constitutional authority under the property clause and the commerce clause to protect and provide the opportunity for continued subsistence uses on the public lands by Native and non-Native rural residents.}\textsuperscript{206}
\end{quote}

\textit{to satisfy the spiritual need to show respect to the bear, which includes not dis-
cussing their intent prior to hunting. Individual bag limits may restrict the cul-
tural need of a successful hunter to share his catch with members of his family
and community. To achieve the goals of management, they must be viable in the
field. The best-conceived regime cannot be effective if it is ignored by local
hunners because they feel it is inappropriate. The attitude of local hunters to
management regimes and their willingness to cooperate to achieve the goals of
management are crucial parts of the regime-hunter interaction.}

\begin{quote}
HUNTINGTON, \textit{supra} note 129, at 5.
\end{quote}

\textsuperscript{201} ALASKA DEPARTMENT OF FISH AND GAME, \textit{supra} note 103;
HUNTINGTON, \textit{supra} note 129, at 99, 141–46. As argued by Magdanz, Utermohle and Wolfe:

The freedom to organize wild food production in different ways is benefi-
cial to both users and managers. Users benefit from being able to harvest, proc-
cess, and distribute wild foods in ways that are efficient, socially and culturally
acceptable, economically rewarding, and (perhaps most important) personally
satisfying. Managers benefit because their efforts are more likely to be successful
when they recognize and work within existing social and economic organiza-
tions.

\begin{quote}
MAGDANZ, UTERMOHLE & WOLFE, \textit{supra} note 110, at 120.
\end{quote}

\textsuperscript{202} STUART A. MARKS, \textit{The Imperial Lion} (Westview Press 1984) (em-
phasis added), quoted in HUNTINGTON, \textit{supra} note 129, at 1–2.

\textsuperscript{203} HUNTINGTON, \textit{supra} note 129, at 79–81, 99–100, 144–55.

\textsuperscript{204} CASE & VOLUCK, \textit{supra} note 8, at 288–302; HUNTINGTON, \textit{supra} note

\textsuperscript{205} 16 U.S.C.A. § 3101(c) (2000).

\textsuperscript{206} Id. § 3111(4) (2000) (internal citations omitted).
Hence, after conservation, the federal resource management’s primary aim is to afford subsistence users a priority in the taking of fish and game.\textsuperscript{207} As opposed to the state, the federal government is not legally compelled to respond to the competing claims of different user groups.\textsuperscript{208}

The ability of federal managers to accommodate the concerns of Native users can also be linked to the role played by subsistence users within the Federal Subsistence Board’s decision-making structure and processes. The Federal Subsistence Board has set up ten Regional Advisory Councils.\textsuperscript{209} The members of these councils must reside in the region for which they are appointed and be ‘ knowledgeable about the region and subsistence uses of the public lands therein. ’\textsuperscript{210} No specific requirement for Native participation in the councils exists but Native people appear to be well-represented.\textsuperscript{211} The councils collect local information and then develop, review, and present recommendations to the Subsistence Board.\textsuperscript{212} The Subsistence Board must consider the report and recommendations of the regional advisory councils when enacting regulations related to subsistence uses of fish and wildlife.\textsuperscript{213} Its discretion to refuse to implement such recommendations is statutorily limited to situations when the recommendation ‘is not supported by substantial evidence, violates recognized principles of fish and wildlife conservation, or would

\textsuperscript{207} See also Ninilchik Traditional Council v. United States, 227 F.3d 1186, 1191–93 (9th Cir. 2000); United States v. Alexander, 938 F.2d 942, 945 (9th Cir. 1991); Morehouse & Hollemann, supra note 67, at 29.

\textsuperscript{208} The Alaska Constitution mandates the State "to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest." (Article 8 § 1) and to "provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people." (Article 8 § 2). It also provides that "wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use." (Article 8 § 3). Compare Alaska Stat. 16.05.251 (a)(12), (d) and (e), and 16.05.255 (a)(10), with 16 U.S.C. § 3111. See also Case & Voluck, supra note 8, at 286, 292–93, 301–02; Huntington, supra note 129, at 87; Morehouse & Hollemann, supra note 67, at 24–30.

\textsuperscript{209} Case & Voluck, supra note 8, at 302. See also 16 U.S.C.A. § 3115 (2000).

\textsuperscript{210} 36 C.F.R. § 242.11(b)(1) (2004).


\textsuperscript{212} 36 C.F.R. § 242.11(c) (2004); Case & Voluck, supra note 8, at 302.

\textsuperscript{213} 36 C.F.R. § 3115(c). See also Case & Voluck, supra note 8, at 302.
be detrimental to the satisfaction of subsistence needs.’ 214 If a recommendation is not accepted, the Board must disclose the factual basis and reasons for its decision. 215

The Subsistence Board has generally proven receptive to the concerns of subsistence users and to the recommendations made by Regional Advisory Councils. 216 The Board has adopted some regulations demonstrating an improved understanding of Alaska Native subsistence patterns. For example, in many cases federal regulations allow a federally qualified subsistence user (recipient) to designate another federally qualified subsistence user to take specific animal species on his behalf 217 unless the recipient is a member of a community operating under a community harvest system. 218 This flexible measure fosters food security by recognizing traditional patterns of food sharing that have historically assured every member of the community access to traditional foods. 219

Moreover, federal courts have interpreted ANILCA’s subsistence priority as requiring ‘meaningful priority’ for “customary and traditional uses,” so that subsistence uses must be ‘provided first and that nonsubsistence uses be regulated in such a manner as to have the least adverse impact on subsistence,’ 220 Under the federal scheme, traditional means, methods, and patterns ought to be considered when formulating subsistence regulations. 221 In Bobby v. State, 222 the residents from Lime Village, a small Athabascan Native community, challenged the state subsistence regulations adopted under ANILCA, arguing that seasons and bag limits restricted their customary and traditional practices and that those limitations could not be imposed if sport and commercial uses had not been eliminated first. 223 The federal court agreed with them. 224 The following excerpt from the court’s opinion is particularly interesting from a food security perspective and illustrates the spirit in which federal subsistence regulations ought to be developed:

214. 16 U.S.C. § 3115 (c).
215. Id.; Case & Voluck, supra note 8, at 302.
216. Brelsford, supra note 203, at 72 (‘During the five years in which the regional councils have advised the Board on regulatory changes needed to protect subsistence, their recommendations have been adopted into regulation in more than 90% of cases.’). See also Morehouse & Holleman, supra note 67, at 27.
217. 50 C.F.R. § 100.10(d)(5)(ii) (2004). ‘Designated hunter or fisherman means a Federally qualified hunter or fisherman who may take all or a portion of another Federally qualified hunter’s or fisherman’s harvest limit(s) only under situations approved by the Board.’ Id. § 100.25(a).
218. Id. § 100.25(e).
219. Lévesque et al., supra note 103, at 10607.
220. Case & Voluck, supra note 8, at 292; see also Ninilchik Traditional Council v. United States, 227 F.3d 1186 (9th Cir. 2000); Native Vill. of Quin皇后 gak v. United States, 35 F.3d 388 (9th Cir. 1994); Kwethluk IRA Council v. State, 740 F.Supp. 765 (D. Alaska 1990).
221. Case & Voluck, supra note 8, at 292–93.
223. Id. at 768–69.
224. Id. at 781–82.
However, the court feels constrained ... to observe that the Board of Game must in the future proceed with scrupulous care and caution in imposing seasons and bag limits on subsistence hunting. Bag limits and seasons are game management tools which have seen extensive use in Alaska and nationally. These restrictions have typically, if not universally, been used to regulate sport hunting. In this case, bag limits and seasons are being applied to a very different type of game use. In its purest form, the subsistence lifestyle is quite literally the gaining of one’s sustenance off the land. Typically, the sport hunter does not go hungry if the season ends without his taking any game or if he has taken and eaten his bag limit. The subsistence hunter who is without meat during a closed season or who has with his family consumed a fixed bag limit will go hungry unless some other game or fish are available and in season. Hunger knows nothing of seasons, nor is it satisfied for long after one’s bag limit has been consumed.\footnote{Id. at 777.}

The Court further affirmed that any restrictions to subsistence uses, notably regarding bag limits, methods, and patterns of uses, must be justified:

If bag limits and seasons are imposed on subsistence hunting, there must be substantial evidence in the record that such restrictions are not inconsistent with customary and traditional uses of the game in question. It must be clear in the record that subsistence uses will be accommodated, as regards both the quantity or volume of use and the duration of the use. Need is not the standard. Again, it matters not that other food sources may be available at any given time or place. The standard is customary and traditional use of game.\footnote{Id. at 778.}

Apart from these general principles of federal subsistence management, the bowhead whale regulatory system is the foremost example of a flexible regulatory system that favors the integration of Inuit cultural patterns into the law. Whale subsistence hunting has, for centuries, played an important part in satisfying some Alaskan Inuit villages’ cultural, social, spiritual, and nutritional needs.\footnote{MAGGIE AHMAOGAK, ALASKA ESKIMO WHALING COMMISSION, AEWC and Whaling Information, available at http://www.uark.edu/misc/jcdixon/Historic_Whaling/AEWCAewc_maggie%20presentation.htm (last visited Feb. 26, 2005); Jean-Maurice Arbour, La sécurité alimentaire des peuples autochtones quant à la réglementation internationale de la chasse à la baleine : un avenir mal assuré, 94(4) LES CAHIERS DE DROIT 597 (2003); David S. Case, Subsistence and Self-Determination: Can Alaska Natives Have a More "Effective Voice?", 60 U. COLO. L. REV. 1009 (1989), at 1026–27; HUNTINGTON, supra note 129, at 110–15.} Since 1946, that hunt has been governed by the International Whaling Convention and by the regulations adopted by the International Whaling Commission pursuant to the Convention.\footnote{HUNTINGTON, supra note 129, at 52.} In 1949, the IWC decided to forbid the taking of gray and right whales, including bowhead whales, ‘except when the meat and product of such
whales are to be used exclusively for local consumption by the aborigines." 229 The *Marine Mammal Protection Act*, passed by Congress in 1972, also exempted Alaska Natives dwelling on the coast of the North Pacific Ocean or the Arctic Ocean from its ‘moratorium on the taking and importation of marine mammals and marine mammals products’ when such taking is made ‘for subsistence purposes’ or is “done for the purposes of creating and selling authentic native articles of handicrafts and clothing.” 230

In 1977, however, the IWC decided to end the aboriginal exemption after the National Marine Fisheries Service (NMFS) estimated that the bowhead whale stocks were critically depleted. 231 The Inuit, challenging the accuracy of the NMFS estimate of bowhead whales, fought the ban by creating the Alaska Eskimo Whaling Commission (AEWC), an organization representing the ten Alaska whaling villages whose members are whaling captains and their crews. 232 Following the intervention of the U.S. government, the IWC finally decided to lift the ban and approved a limited quota of 18 strikes to be distributed among member villages of the AEWC for the 1978 bowhead whale hunt.233 A cooperative agreement was concluded in 1981 between the National Oceanic and Atmospheric Administration (NOAA), which was responsible for the management of whales, and the AEWC.234 Under this agreement, quotas are still set by the IWC but the allocation of the quotas among whaling communities, the regulation and monitoring of the hunt, and the enforcement of the regulations are the province of the AEWC and the Whaling Captains’ Associations.235 Once the quotas have been distributed among the villages by the AEWC, each local Whaling Captain’s Association adopts regulations concerning the hunt in its own community.236 The management of the whale hunt is thus highly localized and receptive to user needs. After receiving reports from village whaling captains, the AEWC must report to the NOAA the results of each spring and

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229. *Id.*
232. AHMAOGAK, *supra* note 219. The ten Alaska whaling communities are Gambell, Savoonga, Wales, Little Diomede, Kivalina, Point Hope, Wainwright, Barrow, Nuiqsut, and Kaktovik. *Id.* The members of the AEWC are the registered whaling captains and their crew in each community. *Id.* There are voting and non-voting members. *Id.* Only registered whaling captains have the right to vote in the AEWC decision-making process. *Id.*
233. *Id.*
234. *Id.* Section 1388 of the Marine Mammal Protection Act provides that ‘[t]he Secretary may enter into cooperative agreements with Alaska Native organizations to conserve marine mammals and provide co-management of subsistence use by Alaska Natives.’ 16 U.S.C.A. § 1388(a) (2000).
236. *Id.*
under the cooperative agreement, the ‘NOAA may assert its management and enforcement authority’ only ‘[i]f the AEWC fails to carry out its enforcement responsibilities or meet the conditions’ of the cooperative agreement or of the management plan.\textsuperscript{238} This assertion of authority can only be made after the AEWC has been given an opportunity to present its views in a public forum.\textsuperscript{239}

This co-management regime strengthens food security as it provides the Inuit with the flexibility required to manage bowhead whale hunting in a culturally acceptable manner. One of the explicit purposes of the AEWC is ‘to protect and enhance Eskimo culture, traditions and activities associated with bowhead whales and bowhead whaling.’\textsuperscript{240} For example, the AEWC has the authority to define the hunting methods and means\textsuperscript{241} that are presently limited to traditional harvesting methods.\textsuperscript{242} The federal government has no power to intervene in the regulation of whale hunting unless the species is determined, upon substantial evidence, to be depleted.\textsuperscript{243} In such a case, however, federal regulations shall only be prescribed after a hearing and shall be removed as soon as the government determines that the need for their imposition has disappeared.\textsuperscript{244} Consequently, when the bowhead whale populations are healthy, local users benefit from a broad ability to define regulations respectful of their needs and culture. The power of the AEWC to distribute quotas among whaling villages and its obligation to consult each village to that effect also enhances food security in that the specific cultural and nutritional needs of every community will be taken into account.\textsuperscript{245}

The lack of accommodation of Inuit culture in the state regime. The current state management scheme is much less flexible and receptive to the cultural patterns of subsistence and is therefore more problematic from a food security perspective. Alaska’s objectives in resource management are unambiguously outlined in Article VIII of the state constitution, which affirms a strict conception of equality of access


\textsuperscript{238} Id. at 2.

\textsuperscript{239} Id. at 2–3.


\textsuperscript{242} Id. at Section 100.24(a).

\textsuperscript{243} 16 U.S.C.A. § 1371(b) (2000).

\textsuperscript{244} Id.

\textsuperscript{245} See Alaska Eskimo Management Plan, supra note 233, at Section 100.21.
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to state natural resources.\textsuperscript{246} The constitution states that ‘[t]he legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people’\textsuperscript{247} and that ‘[w]herever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.’\textsuperscript{248} Thus, ‘[t]he state’s primary management goal is long-term conservation of resources to assure adequate levels of harvests for all qualified users—sport, commercial, and subsistence.’\textsuperscript{249} In other words, to meet its goal of recognizing equal access to fish and game for all citizens while assuring the conservation of resources, the State will tend to restrict \textit{all} use (including subsistence) by general means, such as bag limits and seasons, without considering the special features and needs of each type of use.\textsuperscript{250}

Under state law, the preference for subsistence uses is not translated into a ‘meaningful priority.’ State law instead provides a ‘reasonable opportunity for subsistence uses.’\textsuperscript{251} ‘Reasonable opportunity’ is defined as ‘an opportunity, as determined by the appropriate board, that allows a subsistence user to participate in a subsistence hunt or fishery that provides a normally diligent participant with a reasonable expectation of success in taking of fish and game.’\textsuperscript{252} Moreover, state law provides that ‘[t]akings and uses of fish and game authorized under this section are subject to regulations regarding open and closed areas, seasons, methods and means, marking and identification requirements, quotas, bag limits, harvest levels, and sex, age, and size limitations.’\textsuperscript{253} The Alaska Supreme Court ruled that ANILCA’s ‘least adverse impact’ or ‘least intrusive’ standard is not applicable to the interpretation of state subsistence law.\textsuperscript{254} Additionally, the court found that state fisheries and game boards have the discretion, but are not mandated, to accommodate customs and tradition in regulating methods of hunting and fishing.\textsuperscript{255}

\textsuperscript{246}\textit{See} ALASKA CONST. art. VIII.
\textsuperscript{247}\textit{Id.} art. VIII, § 2.
\textsuperscript{248}\textit{Id.} art. VIII, § 3.
\textsuperscript{249}MOREHOUSE & HOLLEMAN, \textit{supra} note 67, at 28.
\textsuperscript{251}ALASKA STAT. § 16.05.258(b)(1)(A) (Michie 2004); see also Caldwell, \textit{supra} note 184, at 63.
\textsuperscript{252}ALASKA STAT. § 16.05.258(f).
\textsuperscript{253}\textit{Id.} § 16.05.258(e).
\textsuperscript{255}\textit{Id.} at 370–71. It is worth noting that Chief Justice Rabinowitz and Justice Compton reaffirmed their disagreement with this interpretation for reasons previously stated in \textit{State v. Kluti Kaah Native Vill. Id.} at 370 n.15. ‘Since ‘subsistence hunting’ incorporates ‘subsistence uses,’ and ‘subsistence uses’ contemplates ‘customary and traditional uses,’ reading the subsistence statute as a whole leads me to conclude that subsistence hunting encompasses customary and traditional use patterns, methods, and means.’ \textit{Kluti Kaah Native Vill. of
In practice, the state boards of fisheries and game tend to interpret the term ‘customary and traditional’ in a restrictive manner. They are often criticized for not being responsive to the needs and concerns of local subsistence users, for example, in extending sport regulations to subsistence without evaluating the possible adverse affects on customary and traditional subsistence practices. Also, it is generally recognized that the state fish and game regulatory system is dominated by sport and commercial interests and that, at least outside the most remote regions, subsistence users are poorly represented. The Local Advisory Committees are criticized for not being capable of effectively defending the interests of subsistence users, at least outside the more remote rural communities where those users are in a majority. The failures of the advisory committee system have been explained by factors such as a lack of staff and funding, the formal nature of the system in which many Native village subsistence users feel uncomfortable, and several other structural problems. Numerous authors have noted that the state fish and game management structure is dominated by ‘non-Native urban, sport and commercial hunting and fishing interests’ and that the board members, who are mostly from

Cooper Ctr., 831 P.2d at 1276. This position is a permissible interpretation and one that is more favorable to the food security of subsistence users.


257. MAGDANZ, UTERMÖHLE & WOLFE, supra note 110, at 105–24.


259. The Local Advisory Committees were established ‘to provide a local forum for the collection and expression of opinions and recommendations on matters relating to the management of fish and wildlife resources.’ ALASKA ADMIN. CODE tit. 5, § 96.010 (2005). See also ALASKA STAT. § 16.05.260 (Michie 2000). The local committees are composed of persons that ‘have knowledge of and experience with the fish and wildlife resources and their uses in the area, and have a reputation within the community consistent with the responsibilities of committee membership.’ ALASKA ADMIN. CODE tit. 5, § 96.040; see also ALASKA STAT. § 16.05.260. The members of each committee must be representative of fish and game user groups in their respective area and of each town and village located in the area that the committee represents. ALASKA ADMIN. CODE tit. 5, § 96.060(e)(1).


261. See e.g., Case, supra note 219, at 1033–35; HUNTINGTON, supra note 129, at 82–100; MOREHOUSE & HOLLEMAN, supra note 67, at 24–30.
urban areas, are making ‘wildlife management policies in splendid isolation from the rural (predominantly Native) populations, which are the most heavily affected by these policies.’\textsuperscript{262} There is no mandatory rural or Native representation on the boards and, unlike the ANILCA regime, no assurance that the recommendations of the Local Advisory Committees will be implemented by the boards.\textsuperscript{263} Hence vague terms like ‘customary and traditional uses’ are defined and interpreted by state managers who show little awareness of the reality of subsistence in rural regions.

The state subsistence regulations have been subject to several legal challenges over the last twenty years, indicating the discontent of subsistence users. Although the state assumed management responsibilities under ANILCA from 1982 through 1990, it failed to provide for the priority for subsistence uses guaranteed by ANILCA.\textsuperscript{264} As a result, state regulations were challenged repeatedly in federal courts.\textsuperscript{265} Since \textit{McDowell}, the state regulations have also faced numerous challenges before the Alaska Supreme Court, often because they do not provide for the subsistence priority recognized by the state subsistence law.\textsuperscript{266}

Some of the foregoing cases provide prime examples of state policies that fail to accommodate subsistence uses or that favor sport and commercial uses to the detriment of subsistence. In \textit{Bobby v. State of Alaska},\textsuperscript{267} Athabascan subsistence users from Lime village sought declaratory and injunctive relief, alleging the invalidity of ‘Alaska Board of Game regulations regarding subsistence hunting of moose and caribou.’\textsuperscript{268} Lime Village is a small Athabascan community remote from urban centers and highly subsistence-dependent.\textsuperscript{269} The Board of Game recognized

\begin{footnotes}
\item[262] Case & Voluck, supra note 8, at 286. See also Caldwell, supra note 184, at 63; Huntington, supra note 129, at 82–100; Magdanz, Utermohle & Wolfe, supra note 110, at 105; Morehouse & Holleman, supra note 67, at 24–26.
\item[263] Alaska Stat. § 16.05.260 (Michie 2004) (The Boards have a large discretion to follow or not to follow the recommendations from the advisory committees. Their sole obligation is to inform the appropriate advisory committee of its reasons for not following their recommendations.).
\item[268] Id. at 764, 76869.
\item[269] Caldwell, supra note 184, at 64. For example, Caldwell describes the economic and subsistence circumstances of Lime Village in the following way: Lime Village is a small, remote and isolated Dena’ina Athabascan Indian village located along the upper Stony River (a tributary of the middle Kuskok-
this situation when it found that the residents of Lime Village [were] extremely
dependent on moose and caribou, that ‘the [forty] residents of Lime Village [were]
probably the most geographically isolated and subsistence dependent people in the
state,’ that moose and caribou ‘supply the highest proportion of the food eaten by
residents of the area,’ that Lime Village residents have ‘customarily harvested moose
and caribou on an opportunistic basis throughout the year,’ and that ‘the moose
populations were stable and that the caribou population in the area was at high level
and growing.’

In 1987, despite these findings and without reassessing the subsistence needs
of the Lime Village residents, the board adopted regulations imposing individual bag
limits for caribou and moose hunting and closing the hunts during certain periods of
the year without analyzing their effects on subsistence practices. The Lime Village
plaintiffs challenged the validity of these regulations, alleging that they failed to
provide for the subsistence priority as defined by ANILCA. The federal court
granted the remedies sought by the plaintiffs. The court found that the regulations
were arbitrarily adopted as they failed to accommodate what the board has
previously determined to be the customary and traditional use of moose and caribou
for subsistence purposes. The board imposed closed seasons despite its finding
that ‘Lime Village residents customarily and traditionally take moose and caribou
‘throughout the year.’ It also adopted bag limits without producing any evidence
as to harvest levels. In a very interesting obiter dictum, the court also noted that
individual bag limits were adopted despite substantial evidence that ‘moose and
caribou are taken by a few hunters who then share their take with the whole
community.’ The court advised that ‘the Board of Game must take care to
accommodate the Lime Village tradition of sharing the moose and caribou they
take.’ Since the ruling in McDowell v. State, however, the reasoning of the

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wim River) west of the Alaska Range. The village has roughly 40–50 residents
at any given time, descendants of a semi-nomadic tribe who have inhabited that
part of the world since time immemorial ... The village has no water and sewer
systems; and since it continues to be without electricity, freezers are not avail-
able for food preservation. There is no village store, and thus the people must
obtain food supplements and other supplies by mail, which arrives only once a
week by air, weather permitting (which it often doesn't) ... The people are cash-
poor and vitally dependent upon the harvest of wild, renewable resources.

Id.
271.Id. at 775.
272.Id. at 76869.
273.Id. at 781–82.
274.Id. at 779–80.
275.Id. at 779.
276.Id. at 780.
277.Id.
278.Id. at 781.
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federal court in the *Bobby* case no longer applies to the interpretation of state law, as was held by the Alaska Supreme Court in *State of Alaska v. Morry*.\(^{280}\)

*Morry* illustrates the propensity of the state of Alaska to not account for the specific requirements of subsistence practices and to extend its sport hunting and fishing management tools to subsistence uses. In *Morry*, the Board of Game extended its general big-game tag regulations to subsistence hunters without analyzing the affects of these regulations on subsistence uses.\(^{281}\) The state regulations required a brown bear hunter to purchase a tag before hunting and to affix and keep it on the animal until the animal was “stored, consumed, or exported from the state.”\(^{282}\) An Inupiat subsistence hunter challenged the validity of these regulations after he had been charged with compliance violations.\(^{283}\) The Inupiat regard the requirement of obtaining a tag before hunting as disrespectful to the animal; showing respect to the animal requires the hunter to refrain from discussing his intention before the hunt.\(^{284}\) The Supreme Court of Alaska decided that the board unlawfully extended its big game regulations to subsistence users, stating that sport and subsistence uses are of a different nature and that state law mandates the board to adopt specific regulations for subsistence hunting.\(^{285}\) However, the court also ruled that the board was ‘not mandated to take into consideration the traditional and customary methods of subsistence takings in their formulation of subsistence regulations.’\(^{286}\)

In *Kwethluk IRA Council v. State*,\(^{287}\) the plaintiff, an Indian Reorganization Act Council for the Native Village of Kwethluk, applied for a temporary restraining order and preliminary injunction to allow an emergency hunt of 50 to 70 caribou from the Kilbuck herd.\(^{288}\) The hunt of the Kilbuck caribou was suspended in 1985 due to a sudden decrease of the herd.\(^{289}\) The herd had recovered, however, and it was argued before the Board that the taking of 100 animals would not cause irreversible

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281. *Id.* at 360–62.
282. *Id.* at 360 (citing 5 Alaska Admin. Code tit. 5, § 92.165 (2005)).
283. *Id.* at 360.

In summary, Inupiaq hunters in northwest Alaska believe bears have good hearing regardless of the distance, and hunters must therefore speak carefully about these animals. Knowledgeable hunters advise that the bear’s hyoid bone be removed during butchering, and disposed of properly. The head is traditionally left in the field or in camps. Normally, when hunters follow these practices, they believe they will not have bad luck, their camp will not be bothered, and they will not feel threatened by bears in the future.

*Id.* at 35.
286. *Id.* at 370.
288. *Id.* at 766.
289. *Id.*
damage. Due to economic hardship in the village and the shortage of other food sources in the area, the plaintiff requested that the Board of Game authorize an emergency hunt. The Board agreed that there was an emergency. Nevertheless, the Board refused to permit the emergency hunt, alleging that the ‘hunt was not in the long-term best interests of the Kilbuck herd’ and that ‘any opening for a hunt of the Kilbuck herd would likely lead to excessive and uncontrolled harvest of that herd.’ The court criticized the Board for making its decision without establishing a management plan for the Kilbuck herd and for its lack of a proper working definition of the statutory term “sustained yield,” on which it relied in refusing the emergency hunt. The court stated that ‘the game board appears to have acted not on the basis of a formulated policy, but rather in an ad hoc fashion, as though it had unfettered discretion to decide what meaning it would attribute to the sustained yield issue in any particular case.’ The court held that a hunt limited to fifty caribou would not adversely affect the herd and consequently authorized the emergency hunt.

In State v. Kluti Kaah Native Village of Copper Center, the state of Alaska sought review of ‘a preliminary injunction, which, essentially, replaced the State Board of Game’s seven-day general moose hunt with a twenty-six day subsistence hunt for residents of Kluti Kaah Native Village.’ In March 1991, the Board of Game established a seven-day season to hunt moose, which was open to both sport and subsistence hunters. The residents of Kluti Kaah applied to the superior court for a ‘preliminary injunction prohibiting the state’s enforcement of the seven day hunt and requesting that the court establish a longer subsistence hunt for their benefit.’ They argued that they would suffer irreparable harm if the injunction were not issued, claiming that the seven-day season would not provide sufficient moose to meet their subsistence needs and that it would not afford them an opportunity to pass on to their children their traditional and customary methods of subsistence hunting. Granting the preliminary injunction, the trial court prohibited the state from enforcing the seven-day moose hunt and also requested that the board provide for at least a twenty-six day hunt. On August 21, the Superior Court entered a supplemental order that ‘limited the Kluti Kaah residents to a harvest of no more than forty moose and required that they obtain permits.’

Vacating the injunction, the Supreme Court of Alaska held that the trial court did not consider the interests of other subsistence users (under the state scheme,

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290 Id.
291 Id.
292 Id.
293 Id.
294 Id.
295 Id. at 767.
296 Id.
298 Id. at 1271.
299 Id.
300 Id. at 1272.
301 Id. at 1272 n.3.
302 Id. at 1272.
303 Id.
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potentially all state residents) or guard against depletion of the moose population.\textsuperscript{304} As the court explained:

Although the forty moose limit imposed by the court may adequately protect the moose population if no other similarly situated groups seek an extended hunting season, the superior court can in no way ensure that others will not seek similar relief. If this distinct possibility, in fact, occurs, we question the Court’s acumen, given the procedural and substantive limitations of a trial setting, to accurately determine when the moose population is taxed.\textsuperscript{305}

Further, the court added that ‘[i]n determining whether to issue a preliminary injunction, the trial court should have considered the threat that multiple injunctions would represent to the moose population and the problems it would create for orderly game allocation. Its failure to do so constitutes an abuse of discretion.’\textsuperscript{306}

Finally, in \textit{Native Village of Quinhagak v. United States},\textsuperscript{307} several native villages appealed a decision of the federal district court that denied their motion for a preliminary injunction.\textsuperscript{308} Their motion was incidental to an action challenging state regulations that prohibited subsistence rainbow trout fishing.\textsuperscript{309} The court noted that rainbow trout were an important food source for the residents of the plaintiff villages, ‘especially in the winter, because they retain their fat content and are easy to locate and catch unlike other less dependable food sources.’\textsuperscript{310} Whereas the plaintiff villages were subject to an absolute ban on the taking of rainbow trout for subsistence uses, sport users had access to this resource.\textsuperscript{311} In February 1993, after the villages filed their motion but before the district court’s decision, the Alaska Board of Fisheries repealed the ban on subsistence rainbow trout fishing.\textsuperscript{312} In its place, the Board adopted regulations that allowed ‘incidental takings’ of rainbow trout while fishing for other fish species, but continued to prohibit ‘directed rainbow trout fisheries for subsistence purposes.’\textsuperscript{313} In April 1993, after deciding that ‘rainbow trout are customarily and traditionally taken for subsistence uses in the waters surrounding the Villages,’ the Federal Subsistence Board legalized

\begin{itemize}
\item \textsuperscript{304}Id. at 1274–75.
\item \textsuperscript{305}Id. at 1274.
\item \textsuperscript{306}Id. Justices Rabinowitz and Compton, dissenting, would have affirmed the superior court’s preliminary injunction. They found that that plaintiff established irreparable injury, in that the ‘Kluti Kaah would be denied the opportunity to transmit knowledge of traditional and customary hunting patterns to their children, and that their 1991–92 winter subsistence needs for moose could possibly go unfulfilled.’ \textit{Id}. at 1275. The dissent also found that the Kluti Kaah had established ‘substantial questions going to the merits,’ and that ‘the harm to the state and the public [would] be insignificant’ compared to the prejudice they would suffer if the preliminary injunction was not granted. \textit{Id}. at 1278 (quoting State v. Kluti Koah, No. 3AN-91-04554 CI (Alaska Super. 1991)).
\item \textsuperscript{307}35 F.3d 388 (9th Cir. 1994).
\item \textsuperscript{308}Id. at 389.
\item \textsuperscript{309}Id.
\item \textsuperscript{310}Id.
\item \textsuperscript{311}Id. at 390.
\item \textsuperscript{312}Id. at 391.
\item \textsuperscript{313}Id.
subsistence rainbow trout fishing ‘in remote, non-navigable headwaters of the Villages’ river systems.314 However, the Federal Board did not extend its regulations to navigable waters, which remained subject to the incidental taking regulations imposed by the State Board.315 The major question on appeal was ‘whether, for the purposes of ANILCA, public lands include navigable waters’ and whether the federal regulations were thus applicable to the villages’ subsistence trout fishing in these waters.316

The district court refused to grant the preliminary injunction, holding ‘that the hardships attendant to the dispute do not tip in favor of the Villages because the actual harm involved is the collision of cultures, not the Villages’ lack of access to a traditional food source.’317 In reversing the decision of the district court on the preliminary injunction, the court of appeals discussed the importance of food security. The court decided that the plaintiffs had presented strong proof of injury, as they had established that ‘navigable waters are critical for subsistence rainbow trout fishing.’318 The court noted that ‘rainbow trout is a critical source of fresh fat and protein, especially during the winter when equivalent substitute food sources are not available,’319 and that ‘the federal and state regulations interfere with [the villagers’] way of life and cultural identity.’320 The court strongly criticized the state for promoting sport and commercial fishing at the expense of subsistence users.321

These cases and the relevant literature point to a lack of responsiveness to the cultural dimensions of subsistence on the part of state resource managers and to their propensity to favor sport and commercial uses at the expense of the food security of subsistence users. Thus, the state regime hinders the capacity of individuals to access the food they need because its management tools improperly respond to the culture and traditions of subsistence users and communities (the prime example being the individual bag limits, by which the resource is shared among members of the community).322 The lack of effective Inuit participation in the state fish and game

314.Id.
315.Id.
316.Id. at 392.
317.Id. at 393.
318.Id.
319.Id.
320.Id. at 394.
321.Id. at 394–95. The court of appeals criticized the state in the following words: ‘If the Villages' interpretation of ANILCA is correct, the new state regulations reinforce the state of Alaska’s denigration of the importance of subsistence fisheries.’ Id. at 394. See also Kenaitze Indian Tribe v. Alaska, 860 F.2d 312 (9th Cir. 1988) (criticizing the state for ‘tak[ing] away what Congress has given’ to rural Alaskans by interpreting ANILCA to ‘protect commercial and sport fishing interests’). Arguably, by its narrow interpretation of public lands, the United States has allowed Alaska to continue a policy of promoting sport and commercial fishing at the expense of subsistence users, such as the Villages.’ Id. at 318.
322.See HUNTINGTON, supra note 129, at 94–98 (providing several examples of state management rules that are at odds with Inupiat culture and traditions).
regulatory process is also detrimental to their food security. Such participation would ensure that Inuit concerns relating to food needs are known and taken into account by the appropriate regulatory authority. The failure of the state regime to accommodate subsistence in a culturally adequate way undermines its legitimacy among subsistence users which, in turn, results in limited compliance and potentially defective conservation of species that are critical sources of foods. This problem is compounded in areas where regulations are not effectively enforced due to a lack of resources. Any threat to the conservation of species resulting from the non-compliance with fish and game regulations represents in itself a threat to food security because it impairs the very availability of food sources.

CONCLUSION

Subsistence remains a central component of Alaskan Inuit culture and identity and an important foundation of their social and economic organizations. Moreover, country foods contribute to the physical and mental health of Alaskan Inuit, including both the nutritional benefits these foods provide and the health benefits derived from hunting, fishing, and gathering activities. Despite the fact that contaminants found in certain northern country foods may pose potential public health risks, it appears that the overall benefits of country food consumption and related activities are greater than the risks associated with the consumption of these foods. Therefore, the availability of subsistence foods is necessary for Inuit food security as it provides sufficient, safe, nutritious, and culturally appropriate foods. An inextricable link thus exists between the legal protection of the Alaskan Inuit hunting, fishing, and gathering activities and their food security.

In Alaska, however, the legal capacity of Inuit people to access country foods could be better secured. Various aspects of the regimes governing subsistence activities in Alaska are detrimental to Inuit food security. The first aspect is dual

323. Id. at 5, 98.
324. Id. at 149. Commenting Alaska hunting regulation, Huntington writes: ‘The hunting regulations have a well-defined role, but they are poorly implemented because there is limited enforcement capability in northern Alaska. Without the cooperation of the hunters, there is little hope that the regulations will ever be implemented effectively.’
325. ALASKA DEPARTMENT OF FISH AND GAME, supra note 146; ALASKA NATIVES COMMISSION, supra note 7; BERGER, supra note 6, at 48–72; CASE & VOLUCK, supra note 8, at 258; DUHAIME (ed.), supra note 3; Kancewick & Smith, supra note 8, at 649–53; MAGDANZ, UTERMÖHLE & WOLFE, supra note 110; CULTURAL SURVIVAL QUARTERLY, supra note 8; WOLFE, supra note 78.
326. Blanchet et al., supra note 78; Boudreau et al., supra note 93; Dewailly et al., supra note 88; Friedberg, supra note 89; KUHNLEIN, RECEVEUR CHAN ET AL., supra note 105; Middaugh, supra note 88327.BJERREGAARD & YOUNG, supra note 105, at 21213; Blanchet et al., supra note 48; KUHNLEIN, RECEVEUR, MUIR ET AL., supra note 105.
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federal and state land management, which creates confusion for subsistence users and hampers the sound management of fish and game resources upon which the sustainable availability of foods depends. Another problem is the defective or limited subsistence priority afforded by both the state and federal regimes. Under the state regime, the subsistence priority that is accorded to all Alaskans and the designation of ‘subsistence’ and ‘non-subsistence’ areas has resulted in increased competition for resources, which adversely affects the capacity of local residents to harvest the country foods they need. Under both the state and federal regimes, the subsistence priority is precarious because it hinges on the rural status of a region defined by demographic and economic criteria. The economic development of a region can thus lead to its reclassification as non-rural, causing the loss of the subsistence priority for its residents, whose dependency on subsistence does not end with the region’s new status. Finally, Alaska has so far proven reluctant to accommodate Inuit culture in its subsistence regime. State managers tend to interpret the terms ‘customary and traditional’ in a restrictive manner and to apply Euro-American management tools to Inuit subsistence users without taking into account the dynamics of Inuit subsistence needs and economies. The state authorities also tend to favor sport and commercial uses at the expense of subsistence uses. In addition, Subsistence users are underrepresented in the state resource management system and therefore have little influence on the regulatory process governing their subsistence activities.

Lasting and comprehensive solutions to these food security issues would require not only substantive changes in statutes and regulatory processes, but important constitutional and institutional reforms at the state level in order to better accommodate the unique dynamics of subsistence cultures and economies. Changes could be made within the existing constitutional framework to improve Inuit food security. First, the legal confusion generated by dual land management could be minimized by moving toward more institutionalized channels of cooperative management between state and federal agencies. Despite its shortcomings, the current MOA protocol system reduces the risk of management failures and alleviates the confusion engendered by land management dualism. Statutory codification of the process, comprising dispute resolution procedures, could be a means of fostering the certainty of the cooperative management system.

In addition, accommodation of Inuit cultural, spiritual, and nutritional needs in the state system would be improved by giving Native users a greater say in the state resource management system. Native participation could range from mere consultation to co-management. Co-management institutions, such as the AEWC for bowhead whales, provide a substantial degree of Native control over the regulatory process and are sufficiently flexible to allow culturally acceptable arrangements. The further development of co-management regimes would therefore foster food security. The state system of Local Advisory Committees could also be improved to increase the influence of Native users in the decision-making process. For example, Native representation on local committees could be guaranteed by statute. The discretion of state boards of fisheries and game to reject recommendations made by the committees could also be fettered so as to ensure the adaptability of the system to the needs and concerns of Native subsistence users.

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Finally, Inuit food security would be enhanced by reinforcing the protection of subsistence from the detrimental effects of competition for country food resources. Even if the Alaska Constitution prohibits the preferential treatment of subsistence users based on residency, Inuit capacity to access traditional foods would be strengthened by redefining the subsistence priority to require that non-subsistence uses ‘be regulated in such a manner as to have the least adverse impact on subsistence.’ Likewise, Inuit food security would benefit if the state subsistence priority were defined as encompassing traditional hunting and fishing methods.

328. CASE & VOLUCK, supra note 8, at 292.
CANADA
Chapter Two

Sustainable Food Security in the Canadian Arctic. An Integrated Synthesis and Action Plan

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INTRODUCTION

Food issues are central in the Canadian Arctic. Throughout history, food and food production have been a defining force in Arctic cultures, but the food economy has undergone significant changes in the past few decades, such that, there is now a severe imbalance. Today, most foodstuff is produced outside the northern regions and massively imported, creating an imbalance in food production and consumption patterns. This situation is a reflection of the Canadian Arctic economy generally, which is characterized by an increase in salaried employment, a decrease in participation in customary activities, an increase in the export of non-renewable resources, and the establishment of a market economy. A primary concern related to food economy in Inuit communities is that food access and availability is a prerequisite for public health.

In this paper, the current state of nutrition of Inuit in Arctic Canada is discussed, in the context of socio-economic and legal factors that lay the foundations for securing access and availability, and highlighting the risks to food security. An integrated approach to the research question provides a means of establishing risk in a general sense, to address problem areas in the food supply system and ultimately improve and ensure sustainable food security.

The Concept

In 1975, the United Nations’ World Food Conference proposed that food security is a situation where adequate supplies of food are available to meet an increase in world consumption. Food security is therefore the ‘availability, at all times, of adequate world supplies of basic food stuffs (...) to sustain a steady expansion of food consumption (...) and to offset fluctuations in production and price’ (United Nations 1975, quoted in Le Normand 1996:89). In 1983, the Food and Agriculture Organization indicated that access to stocks, and the constitution of these stocks, as

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essential conditions of food security: ‘Food security is ensuring that all people at all times have both physical and economic access to the food they need’ (Food and Agriculture Organization 1983, quoted in Le Normand 1996:89). In 1996, the World Food Summit proposed a new definition, which was adopted for this program: ‘Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life’ (WFS 1996a). This definition requires that several conditions must be met to achieve a state of food security.

Thus, food security is the capacity of an individual or group to consume a sufficient amount of food to meet their needs. We propose four categories, which place food security on a continuum, from greater to lesser security: sustainable security, relative security, relative insecurity, and chronic insecurity (Duhaime and Godmaire 1999; Davies 1996; Savadogo et al. 1995; Le Normand 1996). Each level of food security reflects various degrees of resistance to fluctuations in the system. When there is low resistance to fluctuations, the system tends to move swiftly from one state of food security to another, for example from relative security to relative insecurity, or to chronic insecurity.

The state of food security is dictated by availability and accessibility, and the many forms these can take in the Canadian Arctic. Availability is defined as the ability of producers of foods (production) and services (circulation) to effectively make supplies available to consumers. Availability is the result of supply mechanisms; that is, the quantity and quality of available food, and it is influenced by numerous factors. Commercial availability is determined, in particular, by the ability of producers of goods and services to deliver to consumers geographically (Le Normand 1996; LePlaideur and Moustier 1991; Franqueville and Prudencio 1991). Availability must also be considered in terms of the status of renewable resource stocks, especially marine and terrestrial mammals, fish and birds that constitute most of the Inuit diet. Fluctuations and environmental threats can affect the availability and health of these food sources for northern communities. Natural forces such as competition, habitat availability, and changes in either predator or prey populations, influence the number of critical country food species available. Other natural and anthropogenic influences such as zoonotic diseases, chemical contamination, and environmental (e.g., climate) change, or harvesting pressures will also directly or indirectly affect the health of key food species, and impact their availability to northern communities. The availability of renewable resources may also be affected by biodiversity, conservation, and wildlife management initiatives with a view to sustainable use.

Accessibility can be defined in several ways. In socio-economic terms, it refers to the ability to acquire supplies made available at markets. It corresponds to what is known as ‘demand’ in economics; that is, the threshold to which consumers are prepared to purchase because they have the material and financial means to do so. Accessibility is itself affected by several socio-economic factors. An available product may not be accessible because the price is beyond ability to pay (Salazar de Buckle et al. 1989). Moreover, relative accessibility does not necessarily mean that needs are adequately met. Food may be accessible because it is affordable, but the supply may satisfy only a portion of the need, either in terms of quantity (abundancy of supply) or quality (nutritional value) (Kachondham 1995; Gaburici 1995, Cannon 1995; Froment and Koppert 1991). Therefore, the relative accessibility of supplies is
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A number of environmental factors can also influence access to traditional food sources. Wildlife distribution, seasonal migration patterns and movements influence a hunter’s ability to procure food resources throughout the year. Our growing knowledge of the potential impacts of climate and environmental change on wildlife distribution and movement, as well as on the suitability and safety of land and sea-based routes used to access these important food species, attest to the significance of these factors on food security and health in the Arctic (Furgal et al. 2002). From a legal standpoint, loss of biodiversity makes it more difficult to arrive at equitable sharing of access to wildlife and increases conflicts between users of the land and its resources. Country food may be available from the land but, in practice, it is the legal framework that determines access to land and food resources, and by extension, the financial resources required to procure those resources. The law can contribute to access by ensuring land and harvesting rights that allow Aboriginal populations to harvest traditional food. The effectiveness of the vehicles designed to implement the legal framework (inspection, activity follow-up) and the existence of other policy objectives, such as species conservation (quotas, prohibitions, sanctuaries) and economic development (outfitters, rough shelters, mining industries), are likely to have an impact on habitat and the stocks available and, consequently, on wildlife resource access and participation in subsistence activities.

FOOD, HEALTH AND WELL-BEING IN THE CANADIAN ARCTIC

As regards issues of health and food security in the Canadian North, one must consider both market (or imported) foods as well as country food sources, and both the benefits and risks they represent in relation to various aspects of health and well-being. Country foods are essential to the nutritional and social health of individuals and communities (Van Oostdam et al. 1999; Receveur and Kuhnlein 1996; Santé Québec 1995; Condon et al. 1995). Country foods and related activities (hunting, fishing, collecting, distribution, preparation, consumption), play a critical role in everyday life in many northern regions for their social and cultural importance and contributions to physical and mental well-being. Further, the consumption of healthy foods (both market and country) are essential to ensure good nutrition and overall health. Current levels of consumption and food preferences vary widely, and no one ideal diet exists. Rather, a whole spectrum of diets, featuring different foods based on availability, preference, and other factors exist across the Canadian Arctic today.

Country Food Consumption and Benefits

Dietary surveys conducted in various regions of the Canadian Arctic have shown that country food consumption levels vary considerably according to such factors as geographic location of the population, seasonal availability of species, and age and gender of the consumer (Kuhnlein et al. 2000; Santé Québec 1995; Wein 1995; Wein and Freeman 1992). In Nunavik, country foods supplied, on average, 25% of the total energy intakes among both men and women according to a 1992 survey. Country food intake was higher (35% of total energy) among Inuit 50 years of age and over than among younger individuals (20% of total energy) and consumption varied seasonally and geographically with greater consumption (frequency and total
amount) observed among individuals living in communities along the Hudson Bay Coast than those on the Ungava Bay Coast. Similarly, dietary surveys conducted in 18 Inuit communities in 5 regions—Inuvialuit Settlement Region, Kitikmeot, Kivalliq, Qikiqtaaluk (Baffin), and Labrador—showed a significant portion of total energy intake was derived from country foods, which varied seasonally (Kuhnlein et al. 2000). Intakes varied between regions in the fall (Inuvialuit: 18 to 32%; Kitikmeot: 20 to 24%; Kivalliq: 22 to 32%; Baffin: 16 to 39%; Labrador: 8 to 24%) and winter months (Inuvialuit: 8 to 21%; Kitikmeot: 10 to 29%; Kivalliq: 17 to 25%; Baffin: 16 to 41%; Labrador: 17 to 23%) and in all regions, country foods were consumed less by younger Inuit (between 15 and 40 years of age) than older individuals. In the community of Sanikiluaq, a survey of 102 households showed that country foods represented an important part of the diet in terms of frequency of consumption, portion size, nutrient contribution to daily diet, and individual preference (Wein 1995). Country food consumption varied very little according to season in this community but total consumption was higher from September to November and higher among men and Elders year-round.

In most Inuit regions, the most commonly consumed species include caribou, ringed seal, Arctic char and other fish species (whitefish, lake trout), beluga whale and narwhal (region specific), bird species (geese, wildfowl), shellfish and berries. Frequency and level of consumption depend on seasonal availability and geographic location (Kuhlein et al. 2000; Santé Québec 1995; Wein 1995). In addition to their contribution to total energy intakes, country foods are important sources of several key nutrients such as protein, vitamin A (derived primarily from marine mammal liver and fats), vitamin D, iron, zinc, potassium, phosphorus, selenium and omega-3 fatty acids. Also, many country foods provide protection against many diseases that are more prevalent among southern populations.

Numerous studies have reported that the Inuit traditional diet, rich in fish and marine mammals, could protect individuals against cardiovascular diseases (CVD) (Dewailly et al. 2001; Dyerberg et al. 1975, 1978; Boudreau et al. 1993; Newman et al. 1993; Middaugh 1990), a beneficial effect attributed to the n-3 fatty acids obtained primarily from marine species. The high dietary intake of these fatty acids may also afford beneficial effects against cancer, diabetes, hyperinsulinemia and birth defects (Young et al. 1999; Dewailly et al. 1998; Friedberg et al. 1998; Storlien et al. 1997; Adler et al. 1994; Kromhout 1990; Olsen et al. 1990).

Selenium, obtained primarily from fish and marine mammals, and especially muktuk (beluga skin and blubber) (Blanchet et al., 2000; Kuhnlein et al., 2000) is currently believed to act as an anti-oxidant in the prevention of artherosclerotic diseases (which are not prevalent among Inuit populations) and may reduce the risk of mercury toxicity in humans (Hansen et al. 1994; Salonen 1986; Kershaw et al. 1980).

For many northern groups, the concept of a healthy lifestyle is closely linked to the land and land-based activities (Kuhnlein and Receveur 1996; Shea 1990). However, the trend toward a more sedentary lifestyle—the result of urbanization and acculturation—is now common among many Aboriginal populations. These trends appear to be contributing, in part, to increased obesity, diabetes and CVD (WHO 1990). Fishing, hunting, and other harvesting activities (e.g., berry picking) are opportunities for northern people to increase physical activity, which helps maintain normal weight, prevent metabolic disorders, and benefit from the social and cultural
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aspects of these land-based traditions, that bring inestimable value in health and well-being (Dewailly et al. 2000; Kuhnlein et al. 2000).

Country foods are reported to define, maintain, and increase the cultural, social and spiritual identity and well-being of individuals and Inuit communities (Dewailly et al. 2000; Kuhnlein et al. 2000). Similarly, distinct benefits are attributed to the activities of harvesting, distribution, preparation, and consumption of country food. Eating and sharing country food, and hunting and fishing activities are central to individual and collective Inuit identity, physical health and well-being. The social aspects of sharing are central to the cultural fabric. Food procurement activities utilize and maintain traditional knowledge and skills and provide an opportunity to pass these skills on to younger generations. “They [country foods] are so important to me because they are who we are. They are part of being Inuit. I have always eaten them and always will.” (Labrador Inuk, Nain Labrador; Furgal et al. 1999)

Further, they are desired foods in the North. Inuit in Nunavik reported a number of advantages to eating country foods including health and nutritional aspects, economic cost advantages, as well as benefits of taste and freshness. Residents in this community and women in the western Canadian Arctic did not identify contaminants or food safety issues influencing their choice of whether or not to eat country foods (Kuhnlein 2001). “For the old people, the food for them is real food—strong food like igunaq, seal and all kinds of country food, and when they don't have it for a long time they start craving it…it's their way of life.” (Quataq resident, O'Neil et al. 1997)

The benefits associated with country foods must not be overlooked as they remain central to the overall health and well-being of many individuals and communities in the North today.

Market Food Consumption
In general, the large majority of total energy intake among northerners comes from a variety of market food items. As it is with country food consumption, the intake of market foods varies across regions, gender, and age throughout the Canadian North. In 1992, the most popular market foods consumed in Nunavik were sugar and sweets, pasta, rice, tea, coffee, bannock, sweetened beverages, butter, shortening and white bread. Intakes of perishable market foods such as milk and dairy products appeared to be related to availability, which varied by community (Dewailly et al. 2000). Results of research by Kuhlein et al. (2000) in five Inuit regions reveal that market food consumption was higher among younger Inuit (< 40 years of age) and the foods most frequently consumed were tea, coffee, soft drinks, powdered drinks with vitamin C, unfortified powdered drinks, white bread and sugar. Similar results are reported for the community of Sanikiluaq (Wein 1995).

The nutritional deficiencies among some northern Canadian populations may be related to insufficient consumption of healthy market foods (such as fruit, vegetables, dairy products and whole-grain cereals) and a decrease in country food consumption among some segments of the population. The consumption of healthy market foods combined with that of nutrient-rich country foods could ensure optimal nutrient status among Inuit and other Aboriginal populations. However, in general, few northerners (20% in Nunavik) feel that market foods are of higher quality than traditional food species (Santé Québec 1995). As well, residents are concerned about
the quality and freshness of market food items in their communities. Kuhnlein et al. (2000) and Bernier (unpublished data) report that such aspects as availability, convenience, taste, and variety factor heavily in an individual’s choice to consume these foods.

**CONTEMPORARY FOOD ISSUES IN THE CANADIAN ARCTIC**

Food consumption patterns in the Canadian Arctic reflect a mix of both country and imported foods. Many studies have shown the important role of country food production for Arctic communities, both in terms of economic importance, cultural and spiritual value, and its central place in Inuit identity (Dewailly et al. 1998; Freeman et al. 1992, Lévesque and Duhaime 1991; Freeman 1996; Condon et al. 1995; Poirier and Brooke 2000). This situation is emphasized by political agreements that recognize and protect Aboriginal harvesting rights (Otis 1999; Peters 1999a, 1999b). Other studies have shown the quantitative importance of country foods to community economic structure as well as to the family budget (Usher 1976; Cox 1985, Duhaime 1987; Myers 1982; Quigley and McBride 1987; Chabot et al. 1997; Chabot 2001; Wenzel 1981; Smith and Wright 1989; Smith 1991). However, local food production is supplemented by imported foodstuff that today represents the main source of food intake by the inhabitants of the Arctic.

This may be explained in part by the increased access to imported goods that significantly changed food consumption patterns among Inuit in the early 1960s. Parallel to this, the move to settlements, along with increased opportunities for wage labour and the introduction of federal transfer payments, rapidly brought Inuit into a new economic order that caused profound changes to the socio-economic organization of the community and family networks. Despite these rapid changes, customary food distribution and sharing networks continued to operate (Lévesque and De Juriew 2000; Wenzel and White 2001), and indeed adapted to the new economic order by integrating the demands of a monetary economy with those of customary economic activities. Increased social stratification also occurred, and led to the emergence of social groups that could no longer secure for themselves a steady supply of country food. This situation is now evident throughout the Canadian Arctic, marked by a higher degree of poverty among Inuit families, the establishment of food banks, and a decrease in purchasing power.

Other adaptation processes have worked to strategically integrate these economic spheres as complementary activities within a mixed economy. For example, traditional sharing relationships within the community, whether driven now by ability, luck, employment or cash access, equalize the balance of food production. Sharing takes the form of gifts of meat or fish, or meals shared in a household. Individuals often reported that they did not prepare much country food, but that they ate it regularly at their parents’ house. In fact, as Wenzel and White (2001) argued, the senior heads of extended families often control sharing within the family, taking in food and cash from children, and redistributing it within the family.

A variety of Inuit sharing patterns have been described (for overviews, see Collings et al. 1998; Buijs 1993; Wenzel and White 2001; Caulfield 1997; Lévesque and De Juriew 2000). These sharing networks take on many forms; some are general, and involve sharing between hunters, between members of the extended family, with namesakes and others important in social networks, with the ‘needy’—widows,
elders, and individuals unable to hunt for themselves, and with the larger community. Sharing may be characterized as ‘free access,’ where individuals are permitted to access a portion of a harvest or food supply. Other sharing is by invitation, whereby specific individuals will be invited to partake of a catch, or an announcement will be made over the community radio, inviting people to partake of a harvest. Finally, there can be targeted distribution, whereby a specific portion of meat might be taken to a distant household. According to Collings et al. (1998) this sharing emphasizes country food, with imported food being shared only situationally, and given less value. These patterns are subject to specific arrangements and modalities according to local conditions. Nevertheless, it is important to keep in mind the variety of sharing patterns and the fluidity of their adaptation in the rapidly changing world of the Arctic. Historical factors explaining the vitality of country food production and circulation must be paired with the legal conditions that permit the continuation of customary activities through a set of legal tools that provide land and harvesting rights.

There are several reasons for legally protecting the subsistence activities of Inuit and Arctic communities. Aboriginal access to land and land resources is considered a key component of the food security strategy, a means of promoting cultural activities and traditional knowledge, and a sustainable development aim for the Arctic (Rovaniemi Declaration 1991; Agenda 21 1992; Otis 2002). In Canada, the subsistence activities of the Inuit are recognized and protected by law—agreements signed and international treaties designed to protect biodiversity, wildlife resources, habitat and the traditional activities of Aboriginal and other populations in isolated communities. In particular, the James Bay and Northern Quebec Agreement (JBNQA), the Migratory Birds Convention Act and the Marine Mammals Protection Act recognize Inuit rights to engage in traditional hunting, fishing and trapping activities. These legal instruments award the most significant land rights to Inuit, and give priority to subsistence activities over other resource uses. The law allows Inuit the right to hunt animals that might be legally protected species in other circumstances. Within this prescriptive context, biodiversity conservation is the only objective that could restrict Inuit hunting, fishing and trapping rights.

As regards wildlife conservation in the Canadian Arctic, international conventions and national laws have established exceptions, allowing the Inuit to harvest mammals, fish and birds during closed seasons or year-round prohibitions, in accordance with established conservation principles. The International Convention for the Regulation of Whaling (1946, Washington) and the Canadian Marine Mammal Regulations give Indians and Inuit exclusive but limited rights to hunt and use marine mammals for subsistence purposes. Catch limits are relatively small: in 2000, the quota for bowhead whales, Eastern North Pacific grey whales, West Greenland fin whales, and West and East Greenland minke whales totalled about 300 (IWC 2000). After its withdrawal from the International Whaling Convention and its Commission in 1982, Canada was no longer bound by the moratorium on commercial whaling or other Whaling Commission regulations. However, it still abides a limited harvest of whales for Aboriginal traditional and subsistence activities (McDorman 1998). The International Agreement on the Conservation of Polar Bears and their Habitat (1973) also permits Inuit to hunt polar bears—a protected species. In summary, the right of Canada’s Aboriginal peoples to hunt
marine mammals is guaranteed by national law, but the practice is restricted in keeping with conservation principles.

Arctic breeding bird conservation is another important area where subsistence exceptions are allowed. The *Migratory Birds Convention*, signed in 1916 by the United States and Canada, allowed Indians and Inuit to harvest certain species birds and eggs (e.g., auks, anklets, guillemots, murres, and puffins) throughout the year. In 1995, the original convention was amended to promote migratory bird conservation while retaining the traditional harvesting rights of Aboriginal peoples. The convention promotes the establishment of new partnerships through co-management agreements and provides a mechanism for Aboriginal community input into the continental management of migratory birds. Furthermore, the 1995 amendment provides for a year-round extension of hunting privileges to qualified non-Aboriginal residents of northern communities who depend upon a subsistence lifestyle, where relevant Aboriginal treaties or agreements permit the activity.

With respect to wildlife resource management, the fish and game instruments applied in the Canadian Arctic fall under provincial and territory statutes and comprehensive claims agreements protected by section 35 of the *Constitution Act, 1982*. Therefore, different systems of management of wildlife and fisheries are in place for Nunavik, Nunavut and Yukon (Peters 2002). In Nunavik, the *James Bay and Northern Quebec Agreement* (JBNQA), signed in 1975 by the Cree, the Inuit and provincial and federal authorities, introduced a series of measures designed to guarantee access to lands and wildlife resources (Picard 2000; Otis 2002). By introducing legal instruments for protecting the natural resources upon which the communities rely, as well as formally recognizing their right to harvest the resources and implementing this right, the JBNQA went far beyond the laws that were in force at that time.

Importantly, the JBNQA recognized rights related to traditional subsistence activities (section 24). Notably, the Inuit enjoy the sole and exclusive ‘right to harvest’ (hunt, fish and trap) all species, in all of Nunavik (24.3.1-24.3.5) and at any time of the year, for personal or community use and commercial trapping and fishing (24.3.10, 24.3.11a)). The ‘right to harvest’ is exclusive on lands reserved to the Inuit (categories I and II) and, in the rest of Nunavik, is exercised in priority in respect to guaranteed levels of harvesting equal to 1975 levels for all species in the territory (24.3.32, 24.6). This means that any restrictions imposed on hunting, fishing and trapping for conservation purposes apply first to non-Aboriginal and commercial activities. In all areas, certain mammal, fish and bird species are reserved for Aboriginal populations (24.7) (see Table 1). Moreover, since 1993, Aboriginals have had the exclusive right to hunt for commercial purposes (e.g., caribou, arctic hare) and to keep in captivity and husbandry (e.g., caribou, muskox) any species listed in Schedules 7 and 8 (Complementary Agreement no. 12).
Table 1: Species reserved for the exclusive use of Native people and whose management falls under provincial (Québec) jurisdiction.

<table>
<thead>
<tr>
<th>1. MAMMALS</th>
<th>2. FISH</th>
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<tr>
<td>—Weasel</td>
<td>—SUCKER</td>
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<tr>
<td>—Beaver</td>
<td>—Whitefish</td>
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<tr>
<td>—Wolverine</td>
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<td>—Ermine</td>
<td>—STURGEON</td>
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<td>—Wolf</td>
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<td>—Otter</td>
<td>—Mooneye</td>
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<td>—Lynx</td>
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<tr>
<td>—Woodchuck</td>
<td>—GOLDEYE</td>
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<td>—Marten</td>
<td>—Burbot</td>
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<tr>
<td>—Skunk</td>
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<td>—Black bear</td>
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<td>—Polar bear</td>
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<tr>
<td>—Fisher</td>
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<td>—Seal</td>
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<td>—Porcupine</td>
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<td>—Muskrat</td>
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<tr>
<td>—Fox</td>
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<tr>
<td>—Mink</td>
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James Bay and Northern Québec Agreement, Section 24, Schedule 2.

The JBNQA also provides for the establishment of boards or committees to ensure Inuit involvement in decision-making in the management and development of natural resources, and that the rights described in the JBNQA are effectual. For instance, a committee of Inuit and government representatives addresses, manages and, in special cases, supervises and regulates the hunting, fishing and trapping regime (24.4). A committee on the environment advises governments in the drafting of environmental protection laws and regulations, and supervises the implementation of mechanisms to assess the environmental and social impacts of economic development projects (23.5). Other committees examine the impacts of development on natural and social environments and make recommendations to the federal and provincial authorities as to whether or not a proposed project should be approved (23.3 and 23.4) (Verreault 2001).

Finally, Inuit subsistence activities are also protected by environmental contaminant controls. Unlike the Antarctic, the Arctic is not protected by a regional treaty on environmental quality. The various legal instruments used to control pollution in the Arctic are not specific to the region: they are international treaties, agreements, and national legislations of a general nature. For the Arctic, the most significant international regimes are geared toward controlling atmospheric and ocean pollution (see Table 2) (Arbour 2002). At a national level, a significant number of laws and regulations have been adopted by federal, provincial and territorial authorities to control contaminant emissions. In Nunavik, for example, the Environment Quality Act (provincial) and the Canadian Environmental Protection Act (federal) are the most important. The James Bay and Northern Quebec Agreement does not contain any provisions specific to controlling pollution in Nunavik (Section 23), although it does exercise authority through a system of development project impact assessment and review designed to protect wildlife resources and their habitats (23.2.2).
Table 2: Global Agreements and the Arctic

<table>
<thead>
<tr>
<th>1. Protection of Marine Environment</th>
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<tbody>
<tr>
<td>• International Convention for the Prevention of Pollution from Ships (MARPOL)</td>
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<tr>
<td>• Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters</td>
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<tr>
<td>• Montreal Guidelines for the Protection of the Marine Environment Against Pollution from Land-based Sources</td>
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<tr>
<td>• International Convention on Oil Pollution Preparedness, Response and Cooperation</td>
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<table>
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<tr>
<th>2. Protection of the Atmosphere</th>
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<tr>
<td>• Convention on Long-Range Transboundary Air Pollution (LRTAP)</td>
</tr>
<tr>
<td>• Persistent Organic Pollutants (POPS) Treaty</td>
</tr>
<tr>
<td>• The Kyoto Protocol on Climate Change</td>
</tr>
<tr>
<td>• The Montreal Protocol on Substances that Deplete the Ozone Layer</td>
</tr>
<tr>
<td>• Convention on Environmental Impact Assessment in a Transboundary Context</td>
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</table>

The JBNQA changed patterns of economic and community dynamics, paving the way to new lifestyles, operating under legal frameworks and economic conditions that northern peoples had never before experienced. An amalgam of new and old solidarity networks, of modern and customary economic activities, and of cultural values strongly oriented toward country food as a vital component of identity. The new order allowed Inuit to re-create their social networks with a focus on the production, sharing, and consumption of country food, but this within a new economic order brought about by the modernization of the Canadian Arctic. However, the transformations that occurred over the last four decades also placed additional pressures on those networks as channels through which food circulates at the household, the community, and regional levels. Although customary networks continue to exist that ensure some degree of the supply, a significant portion of the food consumed at the household level relies on southern production and air transport distribution systems. But, the sustainability of these networks, and ultimately food security, are at risk when certain elements of the system are considered.

RISKS RELATED TO COUNTRY FOODS

Natural Factors and Resource Availability
In addition to regulatory and socio-economic forces affecting availability and access to wildlife resources, a number of natural and anthropogenic forces are important to food security. Populations of Arctic species fluctuate naturally, some on an annual basis, others according to decadal patterns that are reactions to or influenced by such factors as: the availability of prey species, changes in habitat, intra- and inter-species competition, and other environmental factors (e.g., climate change). Human activities also impact animal numbers and distribution (e.g., harvesting patterns, habitat disturbances from development); some forms of interaction can compromise the safety of resources for human consumption (e.g., chemical contaminants).

It sometimes can be difficult to discern between natural and anthropogenic influences on wildlife population numbers. Estimates of population size and status trends carry a certain degree of uncertainty, since the formulas used to calculate the
population size of some species are themselves, out of necessity, often based on various approximations because of the ecology (e.g., arctic marine mammals spend a significant period of time under the water or ice, and population surveys must account for a certain number of animals that are not ‘visible’), distribution patterns (e.g., many Arctic mammals occupy a large territory during the same season or year), or the assessment methods and/or technologies used (e.g., telemetric techniques vs aerial or ground ‘visual’ surveys) (CAFF 2001). Despite their shortcomings, however, such assessments are critical to our understanding of northern food security as the results provide some insight into the reliability of wild resources upon which people rely or derive advantage to varying degrees at certain times of the year.

Population estimates and trends (where available) for some principal Arctic country food species consumed in many Inuit regions are provided in Appendix 1. In general, most barren ground caribou herds are not threatened at current consumption levels (Appendix 1). The cyclical nature of these populations and potential influence of such things as industrial development activities (e.g., oil and gas in the western Arctic) and impacts of environmental change make future predictions for these herds difficult. Stocks of ringed seal, an important marine species utilized in many regions, and which is ubiquitous throughout the Arctic, are not being threatened under current harvesting regimes. However, accurate estimates of these stocks are difficult as animals are numerous and occupy large geographic areas. Harvests of such species as narwhal, beluga and bowhead whale are strictly controlled throughout the North by an annual quota system. Beluga whale populations in some regions are currently under pressure even at current harvest levels and some populations are considered ‘endangered’ (Appendix 1). For example, according to the Department of Fisheries and Oceans Canada (2002:7), ‘…if current levels of harvesting continue (>140 beluga killed from the Eastern Hudson Bay population in 2001), then this population could disappear in the next 10-15 years.’ Finally, population estimates for locally harvested fish stocks are generally limited; more is known about commercially exploited species. Populations and trends of primary marine and terrestrial bird species (eiders and geese) vary geographically, but numbers seem to be decreasing in some eastern regions (Appendix 1).

It is difficult to predict the future status of these populations, however, as they will be influenced by a number of factors. For example, it is in northern regions that climate related changes and impacts to ecosystems and human health are potentially the greatest. According to Inuit observations, climatic regimes are already changing across the north, and these changes are having impacts on, among other things, the status, health, and accessibility to wildlife species by communities (Fox 2002; Furgal et al. 2002; Nickels et al. 2002). Accessibility to country food is directly related to resource availability, which in turn is affected by changes in the distribution of plant and prey species, or other temperature mediated habitat changes that can impact the health and distribution of wildlife such as caribou and Arctic char (Nickels et al. 2002; Powers et al. 2000). Changes in precipitation patterns and levels (as predicted and observed in some regions) have implications for wildlife access to food resources (e.g., caribou foraging for lichen through ice cover in winter) (Furgal et al. 2002). Higher temperatures during summer months may affect animal populations by an increase in pest insects, which in turn can negatively impact wildlife health. Further, changes in weather, extremes, storm patterns, and precipitation regimes, can all potentially impact northerners’ ability to access wildlife resources. Knowledge
related to ice stability, snow conditions, and weather have been integral to northerners’ ability to survive and harvest resources from the territory. Changes in these conditions further challenge reliable access to country food species throughout the year (Furgal et al. 2002). Additionally, higher temperatures may influence the transport, distribution and/or redistribution of environmental contaminants in the Arctic ecosystem, affecting the safety of these resources for human consumption (AMAP 2002).

Contaminants and Arctic Wildlife
Northern contaminant levels and factors influencing trends need to be considered in assessing the safety of country food species for consumption. The geographic and temporal data available will have significant impacts on discussions relating to food security. The levels of several primary and banned organochlorines found in Arctic biota have declined or mirror historical use (CACAR II 2003; AMAP 2002). For polychlorinated biphenyls (PCBs), levels have generally decreased with variations across the north. In polar bears and beluga whales, this decrease appears to have leveled off since the mid-1990s. Some studies have used these data to model and predict a relatively rapid decline in PCB and Dichloro-Diphenyl-Trichloorethane (DDT) levels in ringed seals over the coming decade. However, this rate of decline is not expected to be the same for all species, since contamination level is influenced by lifespan of the species and its position in the food chain (CACAR II 2003; AMAP 2002). Additionally, increased concentrations of some substances are being found for the first time in Arctic wildlife (e.g., brominated flame retardants in polar bears).

Our understanding of the effects of heavy metals in the Arctic environment has advanced considerably over the last two decades. Of particular concern is an observed increase in levels of mercury throughout the North and in Arctic biota (CACAR II 2003; AMAP 2002). Local initiatives to reduce lead in wildlife and therefore human consumption of this metal have been effective in many regions. A ban on the use of lead shot in harvesting wildfowl in Nunavik is one such example, as it was a primary pathway of exposure for humans. Problems with lead still exist in regions where such a ban is not in effect. Levels of cadmium and effects in Arctic wildlife remain unclear. Some high levels have been detected in wildlife, and in specific tissues (e.g., liver and kidneys of some terrestrial herbivores, such as caribou and moose). In some areas of the Canadian North, recommendations advise safe levels of consumption of such items as moose and caribou liver and kidney. Recent data showing increased levels in some regions calls for further monitoring of this contaminant and its potential effects on wildlife health. Not only are these organic and metal contaminants of importance in terms of their safety for human consumption, but also for their potential effects on wildlife numbers as some of these chemicals have potential immune, reproductive and developmental effects in Arctic wildlife.

Contaminants and Country Foods
Two principal groups of environmental contaminants in the Arctic food chain identified as presenting risks to human health are heavy metals (e.g., mercury, lead, cadmium) and organochlorines (e.g., PCBs, and chlorinated pesticides). Many of these contaminants are transported to the Arctic region by atmospheric and oceanic currents and deposited via precipitation, and find their way into the terrestrial,
marine and freshwater food chains (Barrie et al. 1992). High lipophilicity and persistence in the environment allows organochlorines to bio-concentrate in fatty tissues of animals and biomagnify up the food chain (Muir et al. 1992) into animals often consumed by local residents.

The greatest health risks from exposure to these contaminants include adverse effects on the immune system, on child development (neuro-development in particular) and potentially on hormone dependant diseases and reproduction (Van Oostdam et al. 1999; Dewailly et al. 1998; Ayotte et al. 1996; Egeland et al. 1998; Kuhnlein et al. 1995). Based on results from epidemiological studies of children in other regions of the world, it has been suggested that those who have been exposed to PCBs show diminished learning abilities. Such effects have been suspected for the Inuit population and are the focus of current study (Muckle 1994; Muckle et al. 2001). There is a close relationship between maternal and cord blood contaminant levels; contaminants can be transferred to the infant through breast feeding. Thus, it has been hypothesized that the high incidence of infection among Inuit infants may be partially related to the relatively high maternal contaminant burden and the partial transfer of these to the newborn during breast feeding (Dewailly et al. 1998). In addition to these pollutants, exposure to higher levels of lead and methylmercury are also recognized as having a neurotoxic effect upon the foetus (Dewailly et al. 2001b). For these reasons, until now the evaluation of health risks associated with food-chain contamination has focused primarily on women of reproductive age and infants, as they are the most sensitive or ‘at-risk’ members of the population (Ayotte 1994; Ayotte et al. 1995, 1996).

Just as country food species differ in terms of their ecology and diet, so do the pathways for human exposure differ for a variety of environmental contaminants. According to Kuhnlein et al. (2000) in five Inuit regions surveyed, the daily diet of about 55% of the population contains heavy metals (e.g., mercury, lead and cadmium), PCBs and chlorinated pesticides, which often exceed established government guidelines. Ringed seal meat and lake trout are the major sources of mercury, while caribou and arctic char are the main contributors of lead. Caribou meat and the flesh and kidney of ringed seal are also the main sources of cadmium in these regions. The major sources of organochlorine exposure are marine mammal fats including narwal and walrus blubber, and beluga oil. Geographically, higher contaminant levels have been found in residents of Baffin communities, and have been attributed to higher levels of consumption of sea mammal species. Ringed seal meat appears to be the major source of mercury in this region, whereas it is beluga skin and fat (muktuk) for Inuit living in the Kivalliq region. The major source of organochlorines is narwal muktuk in the Baffin region, beluga muktuk in the Inuvialuit, Kitikmeot and Kivalliq regions, and lake trout in Labrador.

In Nunavik, close to 80% of chlorinated pesticides and PCBs (in men and women) originate from the consumption of beluga muktuk, ringed seal fat and, to a lesser extent, fatty fish such as Arctic char, Atlantic salmon and lake trout. Bird species, such as Canada goose and willow ptarmigan, are the main sources of lead (Dewailly et al. 1996, 2001b). Beluga meat and skin, seal liver and meat, waterfowl and fish such as lake trout are the main contributors of mercury. However, the cadmium contamination of terrestrial and aquatic food species are of relatively little
importance in terms of human exposure to this pollutant. The large majority of exposure to cadmium is related to tobacco use (Santé Québec 1995).

Zoonotic Diseases and Food Poisoning
Zoonotic diseases (or zoonoses) are animal-borne infections transmitted from animals to humans. In the Arctic, the main activities causing the transmission of zoonoses are the butchering of animal catches, country food consumption (especially raw meat), and contact with or handling of infected pets (Grondin et al. 1996; Butler et al. 1999). Food poisoning is caused by unsanitary handling of country foods and accidental consumption of toxins found naturally in the environment. Not all zoonoses are notifiable or declared diseases and many infections have common symptoms that can be misdiagnosed (Grondin et al. 1996), circumstances that make it difficult to ascertain the number of incidents of food poisoning caused by zoonotic diseases each year. Despite this uncertainty, a number of zoonoses (trichinosis, toxoplasmosis, rabies, and fish tapeworm infection) and causes of food poisoning (salmonellosis and botulism) are prevalent in the Arctic and identified as public health concerns.

Legal Access, Resource Management and Effectiveness of Rights
Today, traditional Aboriginal subsistence activities are recognized and protected by Canadian laws and international conventions and treaties. Although this formal recognition helps secure the Inuit right to engage in traditional subsistence activities, it is not an absolute right and the security it provides remains relative. In practice, the exercise of this right is subject to wildlife resource availability and access. Certain institutional factors contribute to and exacerbate resource availability and access problems and may themselves, with time, become part of the problems. A number of concrete examples illustrate how wildlife resource management, land management and implementation of the instruments negotiated with the Inuit have influenced the exercise of hunting, fishing, and trapping rights.

Wildlife resource management and the conservation objective: Laws designed to ensure wildlife resource management can limit Inuit hunting, fishing and trapping activities as a means to conservation. These restrictions might create local disparities in terms of resource availability and access and to force the Inuit to change, or even abandon, certain hunting, fishing and trapping practices.

The wildlife species conservation objective represents the main restriction to traditional activities. Although there are laws, conventions and treaties that formally recognize the Inuit right to engage in these activities, priority is given to conservation objectives. This is the case with certain marine mammals, such as beluga and narwhal—traditional subsistence resources for Canada’s Inuit populations. In accordance with the conservation principle, a species such as the beluga is currently available and easily accessible to certain communities while it is unavailable or restricted to others. Since 1988, the beluga populations of Ungava Bay and the eastern Hudson's Bay have been identified, respectively, as endangered and threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2002). Beluga hunting is reserved exclusively to Aboriginals and strictly regulated by means of hunting area and seasonal restrictions and northern community quotas. In Nunavik, a 5-year management plan limited harvesting of
beluga whales to a total of 240 whales per year. Reported harvests consistently exceeded this total, ranging from 258 to 302 belugas per year between 1996 and 2000 (Lesage et al. 2001). According to the federal authorities responsible for beluga management, there is a risk that certain beluga populations will disappear if these harvest levels continue (Fisheries and Oceans 2001). In the Amended 2002 Version of the 3-Year Management Plan: 2001-2003, the Eastern Hudson Bay and the Ungava Bay have been closed and a global quota of 210 belugas has been allocated to Nunavik Inuit communities (Fisheries and Oceans 2002). In the closed areas, traditional beluga hunting has been compromised, forcing the Inuit to change where they hunt and how their quotas are distributed, and to purchase belugas harvested in other areas. These restrictions are a source of conflict between the Inuit and the authorities responsible for species conservation. Attention has been called to the uncertain nature of the scientific data used and the increasing influence of animal protection groups (Freeman 2001).

**Land management:** With regard to land management, the main risk to recognized Inuit rights is the proliferation of human activities on hunting, fishing and trapping territories where Inuit do not have exclusive rights. In Nunavik, this is the case on public provincial government lands, which represent the greater share of the territory (category III, JBNQA, s. 24.3.32) (Otis 2002). Mineral exploration and outfitting activities are the primary concerns. A recent inventory reports almost 600 abandoned mineral exploration sites and a number of these sites have significant quantities of waste: barrels, metal scrap, chemicals, gas bottles, etc. (Duhaime and Comtois 2002). There is also concern about the rapid increase in the number of outfitters' establishments, mobile camps, rough shelters, and hunting and fishing licenses issued to non-residents, and about the lack of inspection and supervision by provincial authorities (KEAC 2002b). The impacts of economic development activities on northern habitats and the pressures on wildlife resources by stepped-up hunting and fishing have increased fears that Inuit harvesting rights will be compromised in areas where there is considerable competition with non-Aboriginal activities.

**Implementation of legal instruments in the Canadian Arctic:** The success of recognized Inuit hunting, fishing and trapping rights depends not only on the existence of a legal regime, but also on their implementation and supervision. These factors can have a significant impact on the efficiency and effectiveness of recognized Inuit rights. Examples show that governments are not always scrupulous when it comes to implementing negotiated agreements and that they do not always take northern issues and concerns into consideration when they develop environmental standards that will affect northern communities. Draft regulations respecting residual materials and drinking water, for instance, did not take the nature of the soil and the isolated nature of Nunavik's communities into account (KEAC 2001). This has also been the case with the federal government, which did not apply the environmental assessment regime of the James Bay and Northern Quebec Agreement (JBNQA) until 1995, when it began to implement the Canadian Environmental Assessment Act Canada-wide (KEAC 2002a). Committees created by agreements signed with the Inuit are not always able to fulfill their mandates due to insufficient means (KEAC 2001). These committees are also concerned about the
virtual lack of supervision of activities subject to federal and provincial environmental authorization. A notable example of this is the fact that the Québec Department of Environment no longer inspects outfitters' establishments (KEAC 2002b). In practice, this lack of control and supervision prompts promoters to flout the terms of the agreement and engage in activities without first obtaining the required authorizations. As a result, the Inuit are losing their hard-won negotiated rights.

Finally, it is clear that the growing number of laws and other regulatory instruments applicable to northern lands, the pollution affecting the Canadian Arctic emanating from other regions, and the special characteristics of the Arctic environment and its communities present major challenges to small regional administrations and the regulatory bodies, with their insufficient means, created by agreements signed with the Inuit.

**Socio-Cultural and Economic Barriers to Country Food Accessibility**

Food supply is based upon legal and ecological preconditions. Economic changes may greatly impact food production, circulation, and consumption. Individual hunters and fishers harvest most of the Arctic's resources intended for consumption by Arctic residents. Marine and land mammals, various species of birds and fish are the main focus of harvesting activities, which are carried out using manufactured equipment that requires substantial capital investment (Duhaime *et al.* 1998). A small number of individuals devote most of their time to this activity and consider it their livelihood. Regional and local production of country food provides a small proportion of the food available in stores, and is generally more expensive than comparable items (Duhaime *et al.* 2002b). Food circulation within customary sharing networks provides a considerable proportion of the meat consumed in the total diet and contributes numerous nutrients (Kuhnlein *et al.* 1996).

However, accessibility of country food is dependent on the available monetary resources to purchase the equipment and supplies needed for harvesting. Many Inuit report that the main reason for not having country food is the high cost of equipment (Lawn and Langer 1994). Even though substantial amounts of money are required for country food production, the fact that these traditional activities have persisted reveals their necessity and desirability to Arctic residents. Two trends represent a risk of accessibility to country food.

First, an increase in access to wage labour opportunities may serve to improve the ability to produce country food by providing additional monetary resources to support hunting and fishing activities. However, wage labour is also characterized by work schedules, work relations, and individualism. Despite culturally adapted strategies aimed at promoting and favouring discontinuous work, seasonal employment, and auto-succession within the family unit (Duhaime 1991), increased employment also impacts the pursuit of customary activities. With more people engaged in the wage economy for longer periods, additional pressures can be brought to customary food production and circulation networks, whereby fewer people would be involved on a regular basis. Over the last 20 years, this imbalance seems to have been mitigated by institutionalized solidarity networks established by the state through various programs aimed at supporting hunting and fishing activities. These programs still play a role in the customary economic activities of Inuit communities,
Chapter 2: Sustainable Food Security in the Canadian Arctic

and should be revised in the eventuality of a significant increase in wage labour (Chabot 2001; Kishigami 2000).

Second, there is an observed decrease of economic growth in most communities of the Canadian Arctic, and a growing imbalance between communities experiencing an economic boom as a result of large-scale development projects, and others with nothing. The slower pace of development and the resulting unequal distribution of wealth creation will cause less money to be available to some individuals for local food production or for the purchase of imported food. Individual and family strategies would likely be focused on the purchase of lower-priced and lower-quality imported food, leading to a decrease in intake of locally produced food. Therefore, attention should be focused on maintaining the purchasing power of those who are relatively well-off economically, and improving it for those on social assistance and the working poor.

RISKS RELATED TO IMPORTED FOOD

Risks for Human Health

With the move of northern Aboriginal groups to permanent settlements and communities, country food consumption generally decreased, as many things had changed including improved access to market foods. The substitution of country foods with market foods is not always desirable, especially when the lower nutritional value of some market foods is considered (Santé Québec 1995).

According to Morrison et al. (1995), the nutritional content of the Inuit diet has declined because less country food is being consumed; vitamins and minerals are not being augmented by replacement with healthy market foods.

An increased intake of carbohydrates in combination with a more sedentary lifestyle, the progressive abandonment of parts of the traditional diet, and higher rates of obesity have led to the emergence of type 2 diabetes among numerous native populations (Dewailly et al. 2001a; Young et al. 1999; Greenlund et al. 1999; Schraer et al. 1997; Kuhnlein et al. 1996; Ellis 1994). However, clinical evidence of vitamin and/or mineral deficiencies has not been documented to date for Arctic populations, even though insufficient dietary intakes have been observed to be insufficient according to government guidelines (Van Oostdam et al. 1999).

A dietary survey conducted from 1997 to 2000 by Kuhnlein et al. (2000) reported that intakes of vitamins A and E, folic acid, fibre, calcium, and magnesium did not meet recommended levels. Results also revealed that a greater number of nutrients were available from the daily diet when country foods were consumed than when they were not. Moreover, when country foods are consumed, total fat, saturated fatty acids, sucrose and carbohydrate intakes are lower than when only market foods are consumed. Similarly, in Nunavik, results of the Santé Québec dietary survey indicate that intakes of calcium, vitamins A, and folic acid were below the Canadian recommended levels for all age groups and both sexes (Santé Québec 1995). Iron intakes among women of reproductive age, vitamin C intake among men 40 years and over, and vitamin E intake of men between 18-40 years of age were also considered to be low. Furthermore, the contribution of total lipids to total energy intake exceeded the government recommended levels. The iron intake of Inuit infants may also be considered deficient at current levels. According to Hodgins (1997), whole milk is widely used for Inuit infants instead of fortified milk formulas,
and iron-fortified cereals are rarely used in Nunavik (Hodgins 1997). Finally, for the Inuit of Sanikiluaq, intakes in calcium, vitamin A and C and folic acid were also low and 50% of adults were ‘at risk’ of inadequate intake of these nutrients (Wein 1995). The average intake of vitamin D was close to the recommended level among men and women of all age groups, whereas cholesterol intake exceeded the Canadian recommended level. Therefore, the need for healthy country or market food choices remains critical to the physical health of Inuit in the Canadian North. Despite increased access to a diversity of market foods, a variety of nutritional deficiencies and health risks due to high levels of consumption of some items (e.g., sugars) still exist.

Risks in Terms of Availability and Accessibility of Imported Food
The supply of imported foods relies exclusively on existing transportation systems. On the one hand, air transport is the method of choice (with deliveries several times a week); the short delivery times are well suited to the transport of perishables. In smaller communities, or those without adequate airport infrastructure, supplies may need to be transferred to smaller planes, adding to handling and time costs. On the other hand, maritime shipping is only possible when waterways are ice-free, but the proportion of supplies transported by boat is substantial, in many cases representing a year’s supply of goods e.g., non-perishable dry goods (Duhaime et al. 2002a).

Macroeconomic factors—In an analysis of the availability of imported foods, the vulnerability of the transportation system must be considered. Geographic expanse, severe climatic conditions, infrastructures and technology needs, limited economic viability, and remoteness from southern markets all interact with political factors (national subsidies, tax fiscal policies, petroleum taxation and distribution) that are out of the control of local and regional authorities. Increased transportation costs directly impact both retail prices of imported foods and expenses related to country food production.

The links between the market (and its agents), and the political milieu can greatly influence the availability of financial resources to support economic initiatives. Given that private enterprise is profit-driven, it is nowhere harder to achieve than in the Arctic. The high costs of transportation and production, and limited markets, make profit difficult to attain. Therefore, private small- and medium-scale economic initiatives need to be backed by political decisions that favour the development of programs and subsidies designed to support enterprise, employees, and consumers. Some measures already exist and operate at various levels. For example, over the last ten years, the Food Mail Program has contributed to improving accessibility to more perishable foods, but not necessarily the most nutritious (Lawn and Harvey 2001). The most commonly used imported items comprise prepared frozen foods that are advertised heavily and that fit well into the Inuit custom of preferring foods requiring little or no preparation. The study concludes that the changes brought to the Food Mail Program at the start of the 1990s have not resulted in improvements in affordability. The consumption of fruits and vegetables is higher among those who are relatively wealthy, but lower among those on social aid or the working poor. However, a higher consumption of perishable fruits and vegetables does not coincide with a consumption of fewer foods low in nutrition. It seems that Inuit women (those who most often do the grocery
Chapter 2: Sustainable Food Security in the Canadian Arctic

shopping) are willing to purchase fruits and vegetables only if they can afford them, after buying their desired amount of foods having low nutritive value (Lawn and Harvey 2001).

**Microeconomic factors**—It is not enough to make imported foods available; they must also be affordable. A few studies undertaken over the last few years have shown the striking difference between the cost of living in southern and northern regions (Duhaime *et al.* 2001; Kuhnlein *et al.* 2000). The situation is known to social scientists; however, the ever-growing share of personal income devoted to the purchase of food, and the gap between retail prices in the south and in the north must be addressed. A large proportion (85%) of the total dietary intake by the Inuit of Nunavik is imported from southern markets and mainly acquired by way of a monetary transaction, and usually from local stores (Duhaime *et al.* 1998). This compares with observations from the 1990s in the Inuvialuit region, Nunavut and Labrador, although regional and local variations are numerous (Kuhnlein *et al.* 2000). Of the household budget, 44% is used to purchase foods from the local store, while 11% goes to local food production (Duhaime *et al.* 1998, 2001). Moreover, imported foods are 69% more expensive in Nunavik than in the Quebec City region (Duhaime *et al.* 2001). A similar gap exists for the Inuvialuit region (51%), Nunavut (66%) and Labrador (14%), when compared to 1998 retail prices of 46 food items in Ottawa (Kuhnlein *et al.* 2000).

The current situation impacting food affordability is likely to exacerbate existing inequities, increase social stratification, and add to already overwhelming pressures on family and community networks as the main channels of food supply. This will particularly affect those on social aid and the working poor, but also single full-time labourers, single women with families, commuter workers, and the elderly. Consistent with this point, a large majority of the respondents in the Lawn and Langner study (1994) stated that they did not always have enough money to buy food; the high cost of food was the main reason cited. This observation was echoed in a recent study of two Nunavut communities (Lawn and Harvey 2001). Consequently, a typical Canadian Arctic resident requires money to maintain current dietary levels, in which imported food figures importantly (Duhaime and Chabot 2004).

Current data show the trend reported at the start of the 1990s is continuing. For example, in the 1991 Aboriginal Peoples’ Survey, 13% of Inuit reported that food availability was a problem at some time during the previous year. In this survey, 50% of women in northern communities were concerned about not having enough money for food, and 50% also reported running out of money for food. An interesting example is Pond Inlet, where 68% reported that they had not had enough to eat during the month before the survey (Lawn and Langner 1994, reported in Campbell 1997). In this community, 59% of the respondents of a 1997 study reported that they could not afford to buy all the food they needed from the store (Kuhnlein *et al.* 2000). The 9% variation might result from the use of different methodological tools and conducting the survey at a different time of the year. In the 1997 study, many respondents also raised the issue of not having enough money to buy what they needed: 50% of the total respondents, but with a standard deviation of almost 19, ranging from 17% in Igloolik to 78% in Chesterfield Inlet. Therefore, among the fourteen communities surveyed in Nunavut and the Inuvialuit region,
45% of the respondents in nine communities reported such a situation. In Labrador, the average was 67% of the respondents in the four communities surveyed could not buy what was needed (Kuhnlein et al. 2000).

Access to imported food (and by extension to local food) relies on a series of micro-interventions from several stakeholders who act together to maintain the household food supply by various means. This system, however, does not contribute to sustainable food security because the breakdown of one element would affect a significant part of the population, whether at the household, local or regional level. The system is dependent on fragile political and economic support that, in the face of adverse conditions, place pressure on the sustainability of food security. Other economic pressures are the cost of infrastructure and transport, limited markets, remoteness, and severe climate conditions. At the household level, the system is dependent on interpersonal relationship patterns that are put at risk by the demographic pressure of young generations and the demands of wage labour in a monetary economy.

**PRIORITIES FOR AN ACTION PLAN**

**Political Weight, Economic Viability, and Sustainability**
The very first aspect to consider in addressing sustainable development in the Arctic is local political weight. Given the interrelationship between food security, the natural environment, and sustainable development on the one hand, and the cultural, social, economic, and physical well-being of the Inuit and their communities on the other, efforts to implement environmentally sound and sustainable development should recognize, accommodate, promote and strengthen the role of resident populations. National governments, in full partnership with the Inuit and their communities, should strengthen local active participation in the formulation of policies, laws, and programs in resource management, conservation strategies, and development processes that may affect them. The various local associations that exist throughout the Canadian Arctic (hunting and fishing associations, local and regional development councils, women's groups, churches, community groups, etc.) should be deeply involved in any work aiming toward sustainable food security. A continuing dialogue between the parties should be strongly encouraged.

From an economic viewpoint, the development and maintenance of transportation infrastructure plays a central role in the supply of food in the Arctic; it is at the convergence of access and availability. Nowhere more than in the Arctic is it possible to illustrate to what extent a region can be influenced by and vulnerable to the world system; a region reliant on air connections can easily threaten the availability and affordability of food transported by that means. This is particularly true for small communities that are not directly connected to southern markets by air and that require additional handling that increases the costs of transportation, as well as the risk of spoilage. Air transport infrastructure should be taken in consideration in any action plan aimed at securing food availability, accessibility, and affordability. Moreover, improvement of maritime connections should also be examined for the same purpose. Special attention should be paid to subsidies aimed at equalizing the consumer price index since a common concern of Inuit households today is to have the financial resources to meet the food requirements of the family. An increasing share of the total income is devoted to the purchase of food, placing increased
pressure on family budgets and a necessarily more frequent recourse to solidarity networks. With increased social stratification as a consequence of changes to economic and political structures, this situation is potentially disruptive socially and economically. If no measure is taken, Inuit communities could be faced with impoverishment that is likely to affect entire networks of solidarity. On the other hand, transportation costs, and especially air transport have a direct impact on the cost of living due to the volume of goods that are purchased, whether imported foodstuff, or hunting and fishing gear, motorized equipment, or gasoline.

These measures should be promoted along with approaches aimed at providing economic viability through enhanced local political input. The acknowledgement of political and self-government rights on specific questions related to market and customary hunting and fishing activities are important as preconditions for improving economic conditions and establishing economic and legal elements required to develop commercialisation of locally produced foods. Hunting, fishing and gathering activities contribute more than half of the meat consumed in the Arctic and they are the basis of sharing networks that form contemporary Inuit society. Food supply systems rely on a variety of networks, that involve family and extended family members, as well as neighbourhoods, community institutions (church, women's association, food bank), and institutionalized state programs (Hunter Support Programs, children's school breakfast programs).

Through the years, access to certain wildlife resources has become more difficult, forcing Inuit to travel greater distances and change their practices for access to these resources. Traditional economic activities must be given special attention in order for them to be recognized and maintained as viable in a modern monetary economy. Therefore, measures aimed at integrating these activities into the cash economy should be proposed, such as introducing an adjusted tax on petroleum products for hunters, or on the cost of equipment for small- and medium-sized renewable resource enterprises. Even if these activities are costly, they appear to be at the core of Inuit identity and must not be abandoned in favour of a modern economic model. If these activities continue to this day, it is because they are a part of almost every individual’s reality. Therefore, hunters should be given the economic means to improve the conditions of country food production and to support the associated redistribution networks.

Nutrition, Health, and Environment Strategies

A number of public and environmental health perspectives must be considered in the identification of priorities for an action plan on food security. As discussed earlier, no one ‘ideal’ diet exists for northerners; rather, a variety of country foods and healthy store food items are consumed and are both reasonable and optimal to suggest for the future. Therefore, potential solutions to existing issues related to food security must incorporate both country and healthy market foods. Further, food availability, safety, and viability must be the basis for recommendations. Current data suggests that some households have difficulty accessing enough food at certain times of the year. Specific concerns also exist with regards to the safety of certain food items and some health endpoints (e.g., contaminant exposure and child development; zoonoses and country food consumption; diabetes and sugar consumption). Optimal scenarios for food security must address current nutritional
deficiencies, reduce contaminant exposure, reduce exposure to zoonotic diseases, and address food poisoning problems. As data suggest (Bernier et al. 2003), northern populations desire a variety of food choices; their intent to consume one type of food over another is influenced by perceived access to these resources, which is limited for some segments of the population. The promotion, among the general population in northern communities, of desired country foods which are low in contaminants and high in nutritional content, is recommended. Strategies should promote consumption of such items as caribou meat, Arctic char, berries, and waterfowl meat; healthy store market foods include such items as dairy products, fruits and vegetables. Further, it would be prudent to focus some of these efforts toward those individual most ‘at-risk’ from a public health perspective. Specific strategies are needed to provide access to healthy foods for women of child-bearing age and young mothers because of the sensitivity of the foetus to such things as contaminant exposure (pre- and post-natally), concerns about nutritional deficiencies and the importance of diet in early childhood growth and development, generally. For these reasons, a program that provides free access for pregnant women to country food species such as Arctic char would appear feasible to address some nutritional requirements, individual desires for country food, and contaminant exposures during critical stages of infant development.

In promoting country food, strategies must also consider the current and future viability of exploiting wild resources and other environmental (e.g., climate and natural variability) and anthropogenic (e.g., industrial development and contaminants) forces and their impact on these resources. Further data is required before accurate assessments can be made on the viability and sustainability of such things as large scale commercialization of certain species. In fact, current concerns over some species (e.g., Beluga whales in Nunavik) exclude them from consideration as a food to promote for increased access and consequently consumption by northern populations.

**Wildlife Management Needs, Food Security and the Law**

Institutional structures, policy formation, and wildlife and land management influence food security in northern communities. Policies and legal instruments must be adopted that recognize Inuit traditional and ongoing reliance on resources and ecosystems as essential to cultural, economic and physical well-being. Also important is a reinforcement of the role of these populations in decision-making processes likely to affect them (Agenda 21, 1992, chp. 26). In Canada, Inuit and northern communities have specific recognized wildlife resource access and exploitation rights. In order to promote the sustainability of subsistence practices in these communities, it is important to: 1) eliminate growing conflicts with regards to land and wildlife resource use; and, 2) improve the effectiveness of laws and other regulatory instruments. This requires applying guidelines to implement laws and conventions to control overexploitation of natural resources and, considering the growing use of these resources by non-Aboriginal people, overexploitation in specific areas in the North.

Growing needs and activities (by Inuit and non-Inuit alike) are exerting ever increasing pressures on wildlife resources and habitats. In order to prevent these pressures from causing conflicts and competition that are likely to compromise subsistence activities in northern communities, the land and its resources need to be
managed in a more rational and integrated way. Currently, management is very fragmented in that the process is divided among many authorities from various levels of government as well as local authorities and boards created by agreements negotiated with the Inuit. There are several examples of co-management programs with Inuit partners, but approaches are still primarily sector-based (e.g., marine mammals, migratory birds, fish and game) (Treseder and Honda-McNeil 1999). The sector-based approach does not provide a clear, holistic view of management needs, and prevents consolidation of the data required to make informed decisions. To improve the efficiency with which all relevant information is taken into account when drafting policies and making decisions affecting northern communities, an integrated management system is required for the northern territory as a whole. Several national and international agencies and organizations promote integrated management approaches that raise environmental challenges that fragmentary management programs have failed to address (Agenda 21 1992; Halley 2002).

An integrated approach to activities would serve to better coordinate the various uses being made of the land and its resources, and prevent conflicts between conservation, subsistence activities, and economic development activities. Integrated approaches should be accomplished with Inuit rights recognized by Canadian law. Such an initiative would also serve to improve the efficiency and effectiveness of agreements signed with Inuit and of other relevant regulatory instruments. By coordinating the various responsible authorities, it would be easier for northern communities to ensure that their concerns are taken into account in decision-making processes likely to affect them, that agreements signed with the Inuit are observed, and that supervision and inspection programs are established for northern-based activities. Lastly, an integrated management approach would serve to actualize Inuit participation in decision-making when land management and wildlife resource conservation strategies are being drafted and quotas and restrictions liable to affect their subsistence activities are being set. In these ways, the various laws and conventions that govern the protection, conservation, and sustainable use of wildlife and their habitats will be adapting to the ‘new realities’ of the Canadian and circumpolar North, ultimately serving to better manage these resources for the future, in cooperation with the people who depend on them.
## APPENDIX 1: RESOURCE NUMBERS AND TRENDS FOR SOME CANADIAN COUNTRY FOOD SPECIES

### Marine Mammals

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>STOCK / HERD</th>
<th>ESTIMATE (YR)</th>
<th>TREND</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ringed Seals (Phoca hispida)</strong></td>
<td>Global</td>
<td>2.3-7 mil (1988)</td>
<td>Unknown</td>
<td>Kelly 1988</td>
</tr>
<tr>
<td></td>
<td>Baffin Bay, Davis Strait, Hudson Strait, Lab Sea, Lancaster, Jones and Smith Sounds</td>
<td>1,300,000 (1996)</td>
<td>Stable</td>
<td>NAMMCO 1996</td>
</tr>
<tr>
<td><strong>Beluga Whales (Delphinapterus leucas)</strong></td>
<td>High Arctic</td>
<td>14,000-60,000</td>
<td>Declining</td>
<td>NAMMCO 1999</td>
</tr>
<tr>
<td></td>
<td>SE Baffin - Iqaluit</td>
<td>Not Avail</td>
<td>Increasing ?</td>
<td>NAMMCO 1999</td>
</tr>
<tr>
<td></td>
<td>SE Baffin – Kimmirut</td>
<td>Not Avail</td>
<td>Increasing ?</td>
<td>NAMMCO 1999</td>
</tr>
<tr>
<td></td>
<td>W. Hudson Bay</td>
<td>23,000 -25,000 (1985)</td>
<td>Unknown</td>
<td>CAFF, 2001, DFO, 2002</td>
</tr>
<tr>
<td></td>
<td>S. Hudson Bay</td>
<td>1,000</td>
<td>Unknown</td>
<td>CAFF, 2001</td>
</tr>
<tr>
<td><strong>Bowhead Whale (Balaena mysticetus)</strong></td>
<td>Western Arctic</td>
<td>8,200</td>
<td>Increasing</td>
<td>NAMMCO 2000</td>
</tr>
<tr>
<td></td>
<td>Hudson Bay - Fox Basin</td>
<td>345</td>
<td>Increasing ?</td>
<td>CAFF, 2001</td>
</tr>
<tr>
<td><strong>Narwhal (Monodon monoceros)</strong></td>
<td>Baffin Bay</td>
<td>34,000</td>
<td>Stable</td>
<td>NAMMCO 2000, CAFF, 2001</td>
</tr>
<tr>
<td></td>
<td>Hudson Bay</td>
<td>3,500</td>
<td>Unknown</td>
<td>CAFF, 2001</td>
</tr>
<tr>
<td><strong>Walrus (Odobenus rosmarus)</strong></td>
<td>Atlantic</td>
<td>Unknown</td>
<td>Declining</td>
<td>CAFF, 2001</td>
</tr>
</tbody>
</table>
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Arctic Food Security


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Chapter Three

Setting the Table for Food Security: Policy Impacts in Nunavut¹

Heather MYERS, Stephanie POWELL, Gérard DUHAIME²

FOOD SECURITY AND INSECURITY IN CANADIAN HOUSEHOLDS

In 2001, Statistics Canada released the National Population Health Survey (NPHS), which included content related to health status, use of health services, determinants of health and a range of demographic and economic information. According to the survey report, approximately 8% of Canadians were forced to compromise the quality or quantity of their diet at least once in 1998/99 due to a lack of money (The Daily 2001). The NPHS also found that approximately 3 million Canadians in 1998/99 were considered to be living in ‘food-insecure’ households.³

Food insecurity in Canada is strongly associated, although not exclusively so, with low household income, according to Statistics Canada. One-third of people residing in low-income households reported some form of food insecurity in 1998/99 and almost as many people reported that they felt their diet had been compromised (The Daily 2001). Approximately 58% of households relying on social assistance reported food insecurity.

Food security in Canada is defined as the requirement of adequate amounts of safe, nutritious, culturally acceptable food, accessible to all in a dignified and affordable manner (Koc and MacRae 2001:4). Food security further requires the fulfillment of four needs:

1. Availability: sufficient supplies of food for all people at all times
2. Accessibility: access to food for all at all times
3. Acceptability: culturally acceptable and appropriate food and distribution systems
4. Adequacy: nutritional quality, safety, and sustainability of available sources and methods of food supply.

¹ This chapter is a reprint of Heather Myers, Stephanie Powell and Gérard Duhaime (2004), ‘Setting the table for food security: policy impacts in Nunavut,’ Canadian Journal of Native Studies XXIV (2): 425-445.
² The Social Sciences and Humanities Research Council of Canada, as part of the Major Collaborative Research Initiative, funded this work. The authors can be reached at myers@unbc.ca
³ For the purposes of the NPHS, food insecure households were household respondents that acknowledged any of the three circumstances stemming from a lack of money: worry that funds would be insufficient to buy food; not eating the quality or variety of food desired; or not having enough to eat.
Arctic Food Security

For residents of the Canadian Arctic, the ready availability of nutritious foods, and an assured ability to acquire personally acceptable foods plays an essential role in meeting psycho-social and physiological needs (Campbell 1997:107). Socio-economic and environmental factors have influenced food security in Nunavut, resulting in the need for coherent policy attention. Factors such as employment, contaminants and community lifestyles have fostered changes in food consumption patterns in Nunavut communities.

FOOD SECURITY IN NUNAVUT

Food insecurity is an increasing concern for households in Nunavut communities. While 8% of Canadians reportedly were forced to compromise the quality or quantity of their diet, a substantially higher number of households in Nunavut communities have had similar experiences (Lawn and Harvey 2001). Addressing the four needs of food security as defined above, leads us to conclude that the ability of households in Nunavut to satisfy all the criteria of availability, accessibility, acceptability and adequacy of food is complicated by changing circumstances in arctic communities. However, it is also apparent that some socioeconomic and cultural practices persist, which contribute to food production and sharing, and thereby to a degree of food security.

Acceptability and Adequacy: Food Preferences Among Nunavut Inuit

Food consumption patterns of the Inuit have undergone changes in recent years due to a number of socio-economic and cultural factors. The Inuit diet in Nunavut communities has for a long time consisted of a mix of traditional and imported food, but the balance between these components is changing, with more commercially produced, imported market food being used. Further, traditional food changes have become evident in the use of fewer species and decreased total quantities of local traditional food resources consumed (Kuhnlein and Chan 2000). This has implications for Inuit health, as obesity, diabetes, heart disease, dental caries and other afflictions are increasingly seen in northern communities, associated with the new diet that is heavier in saturated fats, sugars, salt and carbohydrates. The traditional foods, on the other hand, supply many critical nutrients. For many Inuit, these foods are still favoured, consumed and shared within the extended family and community, but many other Inuit find it more difficult to harvest or acquire such foods, or find that their children prefer the store-bought foods that are featured in advertisements and media (Duhaime et al. 2001). In some communities, traditional foods are available from local stores, but this availability varies between communities and over time, and it appears that relatively few buy country food from such outlets.

The importance of traditional food for Inuit people is directly associated with physical health and well-being (Van Oostdam et al. 1999), with the processes of procuring, preparing and consuming country foods holding great social and cultural significance and forming an integral part of Inuit identity (Wein et al. 1996).

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4 These are findings from the Household Food Supply Network Survey. In this chapter, we refer to this as The Food Supply Survey, which is presented in chapter 4 of this book.
Traditional food synthesizes two elements—the body (physical actuality and functioning of the human body) and the soul (spirit, mind, immediate emotional state or even the expression of consciousness) (Borre 1994). Sharing and communal processing of traditional foods are also important to community health (Van Oostdam et al. 1999). Further to the biological/nutritional needs supplied, effort is also required for harvesting, which comprises extensive physical exercise (Kuhnlein et al. 1996); thus, dietary change has complex potential consequences for the health and well-being of Inuit populations.

Various food products of Arctic species continue to be consumed by Inuit in Nunavut. A food survey completed in Belcher Island reported that, as in other aboriginal groups, preference for country foods remains high (Wein et al. 1996). However, there are generational and gender differences in preferences between adults and young people and between men and women (Wein et al. 1996; Van Oostdam et al. 1999; Kuhnlein et al. 1995). Adults identified and rated traditional foods more highly than imported foods, while younger people rated traditional foods lower and imported foods higher than the adults. A majority of the young people had not tasted traditional foods such as arctic fox, polar bear, capelin, and guillemot chicks, though they identified goose, beluga muktuk, blueberries, canned fruit and apples as favourite foods (Wein et al. 1996).

Food surveys and harvesting studies have suggested that traditional food consumption by Inuit has decreased in recent years (Blanchet et al. 2000). Most noticeable among the youth, there is a trend toward increased imported food consumption. Younger Inuit depend more on imported food than their parents (Blanchet et al. 2000). Decreasing traditional food consumption can be a threat to the health and cultural well-being of Inuit populations.

Traditional food and market foods consist of different nutrients and nutrient densities. Traditional foods are the main contributor of nutrients such as phosphorus, iron, zinc, magnesium, vitamin A, selenium, protein, vitamin B, niacin, thiamin and riboﬂavin (Blanchet et al. 2000; Receveur et al. 1997; INAC 2002). These foods are also the main source for n-3 fatty acids, such as EPH (docosahexaenoic acid) and DHA (alpha linoleic acid), which are found to decrease chances of cardiovascular diseases (Kuhnlein et al. 1996). The most significant nutrients supplied by market foods are calcium and sodium. Furthermore, market foods are the main supplier of food dry weight, energy, fat and carbohydrates, but compared to market foods, traditional foods have a higher nutrient density (Kuhnlein et al. 1996). It has become apparent that contemporary Inuit nutrition is short of several dietary components such as calcium, vitamin A and dietary ﬁbre, and includes consumption of too much unsaturated fat and carbohydrates (Blanchet et al. 2000; Receveur et al. 1997; Kuhnlein et al. 1996).

Dietary reliance on imported foods has been related to a number of chronic diseases, which are associated with poor diets (Kuhnlein et al. 1996). Obesity, diabetes and related complications such as cardiovascular disease in Inuit populations can result from increased reliance on imported foods. Changing dietary patterns can be accompanied by lifestyle changes, such as reduced physical activity, which when coupled with an increased intake of saturated fat and sucrose can lead to greater incidences of diseases and poor health (Kuhnlein et al. 1996).

The quality of imported foods found in northern stores is often poor and has become an increasing concern for many northern residents. The respondents to the
Food Supply Survey in three Nunavut communities reported a lack of fresh, affordable, perishable food items at the local stores. One respondent recalled buying a head of lettuce for $5, which was completely rotten on the inside—according to him, a common occurrence.

Access and Availability: Income, Environment and Community Characteristics
Consumption of imported foods has been influenced by their increased availability; in most communities in Nunavut, there are a variety of imported foods available in local stores and in some communities, there are also fast food outlets and restaurants. Media and travel have helped create a demand for a wider variety of foods (Van Oostdam et al. 1999). According to several dietary studies, imported food has become an important food source (Kuhnlein and Chan 2000). A dietary-pattern study completed in a Baffin Inuit community reported that men’s intake of imported food ranged from 53% to 70.5% of total dietary energy expended, depending on the season (Kuhnlein and Chan 2000). Other studies on dietary consumption patterns have had varying but similar results.

Changes in economy have resulted in northern communities taking advantage of resources available outside the local environment; increased access to wages and monetary income, as well as improved transportation links, have helped Inuit to diversify their food consumption (Kuhnlein and Chan 2000; Duhaime et al. 2001). Employment and education have also placed demands on time and therefore require the convenience of food that can be readily obtained, stored and prepared (Van Oostdam et al. 1999). Income and thus the acquisition of equipment also influence the level of harvesting activities (Duhaime et al. 2001); having undergone changes in the means of production, due to mechanized transportation and the use of firearms, harvesting is generally more expensive nowadays.

Access to traditional foods in northern communities is also dependent on factors such as environment, climate and wildlife potential. Traditional food consumption studies found that there is a relationship between uses of traditional food and season. Kuhnlein et al. (1996) indicate that the energy input from traditional food is greatest during August and September and lowest during October and November, reflecting climatic conditions found in the Arctic. Receveur et al. (1997) found that while terrestrial animal-meat consumption is consistent throughout the year (as is the consumption of market foods), fish consumption was much higher during summer-time, a pattern similar to one found among the Inuvialuit in the Northwest Territories (Wein and Freeman 1992). Seasons can affect access to harvesting, as indicated in the Food Supply Survey in Nunavut, where many respondents reported that there were only certain seasons in which they would or could harvest, due to a lack of equipment. For example, some respondents indicated that they hunted only in the winter because they did not have access to a boat for summer harvesting.

Finally, the use of traditional foods also depends on the location of the community. A comparison of studies conducted in the Yukon, NWT and Nunavut found that traditional foods were consumed up to three times as often in communities in the NWT and Nunavut than in the Yukon communities (Wein and Freeman 1995; Wein et al. 1996; Wein and Freeman 1992). As well, it appears that the further north a community is located, the more community members will rely on traditional foods (Receveur et al. 1997; Wein and Freeman 1995). This may be related to factors such
as population size, road access, proximity to animal migration routes, prevalent fishing and hunting practices, costs and availability of market foods and general improvements of communication and transportation with the south (Blanchet et al. 2000). However, a household food survey in Nunavut did not make a clear, linear relationship between small, less economically diversified communities (where imported food took an important role) and larger, wealthier communities, where harvesting and country food consumption rates were relatively high (Myers, ongoing work). Table 1 illustrates the situation in our study communities, regarding size, employment and harvesting rates.

Accessibility of imported foods can also be influenced by the availability of transportation and local market infrastructures (Duhaime et al. 2001). Increased consumption of imported foods is then influenced by the convenience of purchasing from local food stores. Overall, however, the availability of money coupled with the high costs of both imported food and harvesting activities is a major issue for Inuit (Duhaime et al. 2001).

Table 1: Community employment and food use characteristics

<table>
<thead>
<tr>
<th></th>
<th>Small community</th>
<th>Medium community</th>
<th>Regional centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population 1999 ¹</td>
<td>752</td>
<td>1276</td>
<td>1387</td>
</tr>
<tr>
<td>Population 2001</td>
<td>785</td>
<td>1220</td>
<td>1309</td>
</tr>
<tr>
<td>Labour force participation 1999 ²</td>
<td>50.9</td>
<td>54.6</td>
<td>77.9</td>
</tr>
<tr>
<td>Employment rate 1999</td>
<td>34.9</td>
<td>39.</td>
<td>67.1</td>
</tr>
<tr>
<td>Country food harvesting ³</td>
<td>65%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td>Country food consumption ³</td>
<td>98%</td>
<td>98%</td>
<td>93%</td>
</tr>
<tr>
<td>&gt;50% country food consumption ⁵</td>
<td>40%</td>
<td>49%</td>
<td>30%</td>
</tr>
</tbody>
</table>

³Percentage of respondents in the Food Supply Survey who reported harvesting country food during the year.
⁴Percentage of respondents in the Food Supply Survey who reported eating country food during the survey week.
⁵Percentage of respondents in the Food Supply Survey who reported eating more than 50% of their food intake from country food during the survey week.

Food Security Status in Nunavut

Thus, Inuit in Nunavut have a more diversified diet available to them, through traditional harvesting or stores selling both traditional and imported foods. Whether they have access to such foods depends increasingly on income—either for harvesting equipment and supplies or for store purchases. As well, factors of seasonality and climate may affect access, both for harvesting or for transportation of southern imports. Acceptability of foods appears to be changing, with tastes for different traditional and imported foods changing, and generational or gender differences affecting lifestyle and tastes. Finally, adequacy can be seriously questioned, when many families report lacking money or food, and when nutritional quality, especially of convenience foods and poor diets, is low.
PRESSING FOOD PROBLEMS

Nunavut residents face a number of problems in terms of obtaining food. As suggested earlier, traditional food harvesting and production systems continue to operate in Inuit communities, but they have been increasingly afflicted, since people moved into permanent settlements, with rising costs. These costs are driven in part by increasing capitalization: skidoos, boats, motors, gasoline and ammunition are expensive, but they are now the accepted tools of the trade for efficient harvesting. Exacerbating this trend in costs is the persistent high unemployment levels in Arctic communities, the lack of employment opportunities, and the relatively low cash incomes of residents (Myers 2000). Consequent dependence upon Social Assistance affects peoples' abilities to go out hunting or fishing for food. Even those with cash incomes face difficulties: if they work for a non-government employer, they do not receive northern living allowance; prices for food and other items are high even though housing costs may be subsidized; large and extended households require a lot of food. For those buying imported foods, the huge distance from southern suppliers adds heavy transportation costs to foods, and undermines their quality because of the conditions of warehousing and transport.

A new problem affecting country food use is their potential contamination with persistent organic pollutants (POPs). News of this possibility broke in the late 1980s and seriously undermined Inuit confidence in their traditional foods, causing some to move completely to imported foods. This switch, however, has often been correlated with poor nutrition and other, more immediate health effects, such as heart disease, diabetes, obesity, tooth decay and so on. Efforts are now being made to put out more balanced messages regarding the relative risks of POPs and the benefits of a traditional food diet (Kuhnlein and Chan 2000).

High Costs

High costs of obtaining both traditional and imported foods are an increasing issue in Nunavut communities, especially when coupled with high rates of unemployment, and the pattern of increased use of imported food by the unemployed (Campbell 1997:107). This was supported by the Food Supply Survey: 73% of the unemployed reported participating in country food harvesting and 63% said that more than half of their diet was country food. On the contrary, only 57% of the employed participated in harvesting and only 23% consumed more than half of their diet as country food. Despite reports that young people are tending to consume more imported food, the survey of Nunavut communities showed that 97% of young people do consume country food to at least some degree, and 24% said that more than half of their diet was country food.

Costs of non-perishable and perishable items in the ‘Northern Food Basket’ show the higher costs borne by northern residents (INAC, unpublished data, provided by F. Hill, Northern Affairs Program) (see Table 2). It is interesting to note that the price gap between Ottawa and northern communities narrowed significantly over that time period, and also that prices actually fell over the decade, both reflecting changes made to the food mail program between 1991 and 1993.
Table 2: Northern food basket costs

<table>
<thead>
<tr>
<th>Community</th>
<th>1991 costs</th>
<th>2002 costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ottawa</td>
<td>$109</td>
<td>$152</td>
</tr>
<tr>
<td>Iqaluit</td>
<td>$238</td>
<td>$240</td>
</tr>
<tr>
<td>Clyde River</td>
<td>$262</td>
<td>$253</td>
</tr>
<tr>
<td>Pond Inlet</td>
<td>$259</td>
<td>$248</td>
</tr>
</tbody>
</table>

At least partially as a result of these costs, half of the respondents in two Inuit communities felt that most people in the community, whether or not they were on Social Assistance, could not afford to buy enough food to feed their families during the survey period in 1997 (Lawn and Harvey 2001). On the contrary, a study by Sante Quebec in Nunavik asked people if they went without food, and only 20% said yes. Alternatively, one of our social-service oriented informants felt that a lack of food may reflect family spending habits, as well as the local price structures, not necessarily the absence of adequate wages or social assistance. It may be that respondents do not expect to buy all their food, assuming harvesting or sharing to provide a part of their diet. It is important to note that over 85% of people surveyed by Lawn and Harvey in Pond Inlet (2001) felt that most families had access to country food; indeed, the Food Supply Survey indicated that 65% of households received country food and 53% gave it in sharing relationships during the week of our survey. This may be an important complement to expensive imported food, but it is also a way to ensure that people have access to traditional foods and that social connections are maintained. Sharing transactions also involve imported food, with households in three Nunavut communities giving imported food as often as country food.

Even the country food, available in some communities from local commercial country food outlets, tends to be expensive in some consumers' minds. We found that relatively few northern residents bought country food, though we did hear reports of people making purchases from individual harvesters, presumably at more ‘affordable’ rates.

Contaminants

Concern surrounding the contamination of the food supply in the Canadian north first emerged in the late 1960s after levels of methylmercury were found in Arctic ecosystems (Bocking 2001; Usher et al. 1995). From that time on, contaminants such as organochlorines, heavy metals, cadmium, lead, radionuclides and arsenic have been the focus of Canadian research in the north. While some of these contaminants originate from local sources, such as DEW Line sites and mining, most are transported long distances from industrial centres in North America, Europe and Asia, via wind and ocean currents (Barrie et al. 1992). Of particular concern are the persistent organic pollutants (POPs), which are widely dispersed into the environment due to their chemical and physical characteristics. Over time, POPs build up in the fatty tissues of organisms, where they are very slow to change form or break down (INAC 1997). These contaminants also biomagnify, which results when a predator essentially consumes all the contaminants consumed by, and stored in its prey. As a result, species higher up in the food chain, such as some marine mammals,
will have higher levels of contaminants than species lower in the food chain such as plants. Fundamentally, contaminants such as POPs, taken up in the food chain, pose a serious risk to Inuit country food consumers.

The presence of contaminants in such Arctic species as caribou, seals and beluga whales has heightened concerns for the health of people in northern Canada over the last decade. Health risks associated with consumption of contaminated country foods range from immunosuppressive, carcinogenic and hormone disturbing effects to potential neurodevelopmental and reproductive disorders (Colborn 1999). Despite these potential risks, country foods are still important to cultural and personal well-being and essential to nutritional and social health of Nunavut communities, as discussed above. As well, the affordability of country food versus market foods has placed stress on northern communities, where employment rates are low and the price of nutritious market foods are high, thereby making country food the only viable option, although there are still costs associated with country food harvesting.

In summary, Inuit in Nunavut find their traditional food systems changing, due to a number of influences—both negative and supportive (Fig. 1). In turn, these food systems are under influence from a number of federal and territorial laws and policies, as will be outlined below. Without attention to the needs of food security, extreme or unbalanced changes in the food systems could lead, at the very least, to increased health problems for Inuit.

POLICY CONTEXT FOR COUNTRY FOOD PRODUCTION

A number of federal and territorial legislative and policy initiatives affect the ability of Nunavut residents to feed themselves, with either imported or traditional foods. In reviewing their sometimes conflicting influences, locals might be forgiven for thinking ‘the Lord giveth with one hand and taketh away with the other.’ The Federal government provides various standard types of income support, available to all Canadians such as Employment Insurance and Old Age Security, northern tax benefits, and assistance to support housing programs. All of these potentially contribute to food security by relieving some of the other living costs in the North. Of specific interest and direct impact on food production and purchase in the North are the Food Mail program and the Federal Firearms Act.

The Nunavut Government has a number of policies which influence their residents' abilities to harvest and purchase food. Of interest here are the Social Assistance practices, the Hunter Support Program, and the development of country food retail sales.

Federal Food Mail Program and Freight Subsidies

The Food Mail program of the Northern Air Stage Program has been administered by Indian and Northern Affairs Canada (INAC) for many years now, in order to keep the cost of food down (INAC 2001). It subsidizes Canada Post and southern food distributors, when they transport nutritious, perishable foods to isolated communities by air. In 2000/01, INAC spent $22.5 million for Food Mail service—approximately 61% was used to service Nunavut communities (INAC 2001). All northern communities which lack year-round surface transportation access (except during brief freeze-up or break-up periods) are included in the program, and it can be used
either by stores or by individuals, though most subsidized shipments go to stores. Through the Program, reduced postage rates are available for nutritious perishable foods such as fresh and frozen meat, vegetables, fruit, dairy products, eggs and some prepared foods containing such ingredients. Currently, this rate is $0.80 per kilogram for perishable foods, and $2.15/kg for non-perishable and non-food items (INAC n.d. Food Mail Brochure), with an additional charge of $0.75 per parcel. This also covers non-perishable foods such as canned food, cereal and pasta, and essential non-food items like clothing and cleaning supplies. Foods of little nutritional value (pop, potato chips, candy), some convenience foods like fried chicken and prepared sandwiches, and tobacco and alcohol are not eligible.

This rate is not available to northern country food producers, sending food to other northern communities, except now, as part of a new pilot project being tested in a few communities. One country food entrepreneur in Iqaluit noted that he pays more for freight than he does for the actual fish he buys from other communities’ fisheries. In reality this means that communities further from Iqaluit than Pangnirtung are out of the running for marketing their fish catches. Current practices have the airlines giving lower freight rates from the Baffin communities to Ottawa than to Iqaluit, and even backhaul rates from the communities to Iqaluit are higher than for the northward transport. Northern enterprises have an extra burden keeping them from "taking off".

Federal Firearms Act
In February 1995, Bill C-68, An Act Respecting Firearms and Other Weapons was introduced in Canada which required Canadians to apply for gun licences controlling the possession and purchase of any firearms or ammunition. Bill C-68 further required every firearm to be registered within two years and new applicants to pass the Canadian Firearms Safety Test. This became an immediate concern for Inuit, who use firearms as tools for feeding their families and securing their livelihood.

A number of problems have resulted from the new legislation. The process of compliance has been seriously compromised for Inuit in Nunavut, as language barriers, lack of firearms officers or supporting information, and time delays have interfered with the issuing of licences. These delays are not limited to aboriginal peoples, but have been experienced by gun owners across Canada, however, the perceived counter-cultural influence has made it an especially sore point with aboriginal communities. The law has practical impacts, for instance, some people have found themselves in a position, six months after applying for their licence, of not having received it, and not legally being able to buy ammunition. Along with other indigenous peoples in Canada, the Inuit have made the case that their traditional harvesting rights must not be blocked by this legislation, and some say they fear the legislation is one more way southern society and politicians are trying to undermine the northern harvesting-based way of life.

In response to concerns, the Minister of Justice asked for the establishment of an Inuit Working Group on Firearms, under the direction of Senator Charlie Watt. The working group identified the scope and details of Inuit concerns and provided recommendations to the Minister. They wish to create a balance between legitimate safety concerns and their ability to harvest food resources (Watt 2001).
Nunavut Social Assistance
Given the large unemployment rates in Nunavut communities, Social Assistance has acquired an important role in ensuring access of Inuit families to cash income. But how does it help them with food acquisition? The Nunavut Social Assistance Act emphasizes cash-based income but does acknowledge earned income from hunting, trapping and fishing, and in one section suggests that officers may suggest to claimants that they pursue work in traditional activities that are not wage-employed. Social assistance is not normally allowed to be used to support hunting activities—instead, recipients are to buy food and other needs from local stores. In practice however, each community makes the decision about how the money is released, whether through funds lodged for the recipient with the Northern or Co-op store, or released directly to the recipient. Recipients can earn $150-300/month in wages without threatening their Social Assistance payment, and harvesting income is part of the monthly income used to calculate benefits. In a review of the Nunavut Income Support program (Income Support Review Panel 2000), communities frequently raised issues with how Income Support money is paid out (whether to individuals or stores, and whether to hunters or to family food and other purchases), stressing a desire for encouraging self-reliance rather than dependency.

Nunavut Hunter Support Program
Under the new Nunavut regime, a Hunter Support Program has been established, which is designed to encourage participation in country food harvesting. Again, each community is empowered to make their own decisions about who receives funding. In some instances, young, new, ill-equipped people may receive funding for a major piece of capital equipment such as a boat or a snowmobile, and in other instances, established, reputable harvesters may receive support. This has had the effect of increasing the numbers of active harvesters, which may increase the amount of country food available in communities.

Ironically, the Hunter Support Program may conflict with another policy avenue—promotion of commercial country food opportunities as one element of Nunavut's economic development. In one community, the previously active country food outlet operated by the Hunters' and Trappers' Association is now radically less involved in local sales, because it could not compete with the direct sales between consumers and supported hunters (by the Hunter Support Program) or other hunters (Anaviapik, pers. comm. 2000).

Nunavut Country Food Development
Country food has been recognized as a potential part of Nunavut's economic development, and over the past two decades significant effort and millions of dollars have been put into developing this sector: community freezers were installed in many Nunavut communities; training programs were provided in food preparation, processing and packaging; several country food outlets were supported and developed. Some of the latter are now EU-certified, which means they can market their unique products into the lucrative European market. Indeed, Chris Hadfield, Canada's astronaut, took musk-ox jerky from Kitikmeot Foods in Cambridge Bay into space with him. Typically, such outlets process and sell caribou or muskox, depending on what is available through commercial quotas, and often they process
Some have diversified with other products as well; an outlet in Iqaluit sells scallops and shrimp, and other products as available.

Ironically, relatively few Nunavut residents reported purchasing country foods, in our household surveys. Country food prices tend to be the same as, or higher than those of imported foods, reflecting the higher costs of operating in the North. Most of the large outlets focus on retail sales to restaurants and institutions just as jails, schools, seniors’ homes and hospitals. Much of the produce is sold to the south, as well as in the Nunavut centres and elsewhere in the North. The smaller outlets in more remote communities may participate in this type of market as well.

Gas Subsidy Program for Harvesters
As an interim measure to offset increases in fuel prices in 2001, the Gas Subsidy Program for Harvesters was implemented in Nunavut. The gas subsidy took the form of a $300 gas credit, which was made available to full-time, ‘intensive’ harvesters. The program was administered at the community level by Hunters and Trappers Organizations and Wildlife Officers (Government of Nunavut 2001). Harvesters are eligible if they are at least 16 years of age, repeatedly and regularly engage in hunting activities during the annual cycle and do not have an income.

Food Policy Recommendations for Nunavut

The definition of Canadian food security suggests that there are four key components: availability, accessibility, acceptability and adequacy. Satisfying these four components of food security is not always straightforward in Nunavut communities. Sufficient supplies of food may usually be available, but for reasons such as weather, cost, harvest participation or policy/legislation, they may not always be accessible to all people living in Nunavut communities. Culturally acceptable and nutritionally adequate foods are also problematic in some instances, affected by changing traditional food systems, and the increasing use of imported foods. According to the Canadian definition, then, it seems that there are potential challenges to food security amongst Nunavut households. Despite this, it must be noted, the Food Supply Survey in Nunavut households concluded that traditional Inuit sociocultural processes persist which help to share country food and its means of production—and that these sharing practices now extend to imported foods. In sum, Inuit food security appears to be relatively secure, but it faces some pressures, particularly around access and adequacy.

People in Nunavut face decisions regarding food security on a daily, personal basis, in terms of what to buy or access, according to what is available, but the Nunavut Government also faces some decisions on a larger policy basis—what kinds of food are people being encouraged to consume? Given the acknowledged benefits of traditional country foods, the evidence that some people are not able to afford expensive store-bought foods, and that cheaper, non-nutritious foods are increasingly consumed, some questions are begged about inherent food policy in Nunavut.

Despite the intent of the Food Mail Program in making nutritious foods more affordable, the federal programs have the general effect of moving Inuit away from a traditional diet, by supporting subsidized imports of southern foods but not northern-
produced foods\textsuperscript{5}, and also by making ownership and use of firearms much more difficult. The Government of Nunavut programs more openly support the country food sector, both in terms of domestic harvest and commercial harvest. It is apparent, however, that northern residents seldom buy country foods themselves. Whether it is cost or philosophy which drives this choice is not clear, but this is an obvious piece of needed information, which could determine how to make northern-produced country foods more appealing to northern customers.

Canada’s Action Plan for Food Security (Agriculture and Agri-Food Canada 1998) focussed on reducing food insecurity at home and abroad, through ensuring a safe and nutritious food supply for all, finding economically and environmentally sustainable ways to increase food production, and promoting health and education. Priority 5, Traditional Food Acquisition Methods of Aboriginal and Coastal Communities acknowledged the important role that hunting, fishing, gathering and trading play in food security of many communities in Canada. It advocated awareness of traditional foods, reduction of environmental contaminants, sustainable management of resources and appropriate supplementation with high-quality commercial foods as a way to strengthen communities’ access to food.

This suggests some policy and program needs for food security in Nunavut. First, the safety and nutritiousness of northern foods needs to be ascertained and ensured. This will take continued scientific studies about the nature of POPs contamination, and the relative benefits of traditional food versus store-bought food diets. Education about nutritious versus non-nutritious store-bought foods is desperately needed in northern communities, as well as information about the benefits of continued consumption of country foods.

Despite the contaminants issue, scientific studies have reiterated that a traditional country food diet is a healthy and desirable one for northern peoples (Furgal et al. 1999). Nunavut policy should clearly support continued use of country foods. Part of that policy should consist of increasing both domestic and commercial production of country food, within sustainable limits, as well as its marketing in northern communities and southern markets. This has a dual benefit of encouraging employment, whether in traditional harvesting or in processing/retailing, and of encouraging healthier diets. The additional potential for Social Assistance to support harvesting should be explicitly addressed by Nunavut politicians and communities—what is the policy intent—to keep people in the community, buying food from the stores, or to encourage development of self-reliant solutions to a lack of wage-paying employment? The Hunter Support Program contributes to this ethic and may also warrant expansion, or at least coordination with the other initiatives regarding food security, harvest support, and social assistance.

In addition, the Food Mail program could assist the distribution of quality northern foods if it were expanded to allow subsidization of country food freight rates between northern communities. The idea of inter-settlement trade is not new, but if the ‘table were laid for dinner’—including country food production, ‘fast-food/country food’ processing enterprises, inter-settlement Food Mail, nutrition

\textsuperscript{5} A pilot program is being conducted with Kitikmeot Foods in Kugaruk (Pelly Bay), which further reduces freight costs for nutritious imports (@$0.30/kg), and adds country food transport from Cambridge Bay to Kugaruk @$0.30/kg as well.
education programs emphasizing the benefits of traditional foods—it might be seen to contribute to important food security and development needs in Nunavut.

Store-bought food will continue to be valued by northerners, in the same way that most people value food variety. It does seem that the Food Mail Program may have enhanced consumers' abilities to access nutritious foods—a recent survey of food use showed that nutritious perishable foods contributed significant amounts of nutrients, along with country foods (INAC 2002). Improvements in quality and cost are desired by consumers however; given the growing overweight and health concerns in northern communities, further improvements in terms of nutritional quality/access are still desperately needed. It will be up to the stores as well as consumers to assist in achieving this. The solution may lie partly in, as one store manager suggested, ‘more nutritious fast-food’—he argued that people want convenience, lacking time, experience or perhaps skills to cook more raw forms of foods, and that if such fast foods could be made with less fat and more nutrients it would be better. This would be a good start.

Finally, the federal Firearms Act needs to respect and recognize that some Canadians use guns regularly and safely as a part of their livelihoods. Given the deep urban/rural split in Canada over this issue, it is the least likely influence on Inuit food security to be amended.

CONCLUSION

The food security situation in Nunavut is complex and changing. It comprises a traditional food production and diet as well as components of imported southern foods. Like most parts of North America, consumers' understanding of nutrition and food-values is limited; in Nunavut, this may be contributing to a severe imbalance and health impacts.

As Nunavut continues to change, through economic influences, social/cultural influences, demographic changes, and legal/political pressures, food patterns will continue to change. Ensuring continued health and a degree of self-reliance for Nunavut consumers will require policy/legal action from the territorial and federal governments. Key among these actions will be those which promote better nutrition and health, as well as sustainable use of local resources, and the ability of local northern harvesters to both produce food for consumers and to support themselves.

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Chapter Four

Food Production and Sharing in Nunavut; Not Only Discourse, But Reality

Heather MYERS, Stephanie POWELL and Gérard DUHAIME

Introduction

There has been a great deal of discourse about the importance and resilience of traditional food production and sharing patterns in arctic Inuit communities, often leading to politically-focused arguments. This study started from a need to test the reality of these perspectives, and was designed to test the existence of sharing networks in northern communities, the frequency and focus of sharing transactions, and their persistence in spite of changes in community economies and lifestyles. While many studies have evaluated the consumption of traditional and imported foods, focusing on measures such as kilocalories and nutrients, as Collings et al. (1998) noted, there have been very few that examine the nature of sharing patterns regarding food and the means of production in arctic communities. We know that lifestyles in arctic communities are undergoing change, that wage-employment related activities are gaining in importance, and that imported foods are much more commonly used; but have these changes affected traditional sharing patterns?

Much of the literature on changing lifestyles in arctic communities has emphasized changes in consumption patterns from country food to imported food (Condon et al. 1995; Wein 1986; Kuhnlein 1995). It has suggested that a number of factors have contributed to this change—increased education and wage labour involvement; less extensive family production and sharing networks; increased access to imported foods coupled with a pervasive ‘demonstration effect’ that encourages its status and use; lack of harvesting skills, experience and interest among youth; increased costs of participation in the harvest; decreased income from furs and skins; diminishing interest among women to process the traditional harvest.

This paper reports on some findings from a household survey on food sharing and use in Nunavut. To the body of discussion about the changes and persistence of traditional food in northern communities, we will add our results and observations about the use and sharing of country food, imported food and the means of production, in Nunavut today.

The Arctic Food Supply Survey

Household surveys were conducted in three Nunavut communities, as part of a survey of food security in arctic regions of Canada and Greenland. This paper reports some of the results of that survey, with particular emphasis on findings related to harvesting and consumption of country food, the use of imported foods, sharing patterns within and among the communities, and factors related to new socio-economic realities in Nunavut communities.
The communities were selected to reflect various conditions that characterize Nunavut—from more remote communities where there is greater emphasis on traditional resource-based lifestyles than a cash economy, to larger more economically diverse communities where more Inuit are involved in wage-labour. Clyde River is a small community with a population of 752 (Nunavut Bureau of Statistics 2000), located on the eastern coast of Baffin Island. With very few wage employment opportunities and very high unemployment, it is a community that still depends to a large degree on, and has strong ties to, traditional harvesting, although the costliness of this activity may prevent participation by some individuals (Wenzel 1995). Pond Inlet is a larger community (with a population of 1,276), at the north end of Baffin Island; it has a more diverse economy as a result of its development as a sub-regional centre with government services and as the headquarters for the Sustainable Development Department of the Nunavut Government subsequent to decentralization. In this community, one person was reported to have no food supplies because of lack of money. Local informants believed no one in the community was without food unless money was being diverted to other pursuits such as gambling. Medical staff reported that some people were, indeed, going without food. The largest community, Cambridge Bay (with a population of 1,387), located in the Kitikmeot region of Nunavut, in the Central Arctic, has been integrated into the southern economy for a longer period, as a regional government and services centre, a transportation and communications hub, a military (DEW-line) base, a commercial fishing, meat production and trapping locale, and today, headquarters of Nunavut Tunngavik Incorporated (NTI) and Nunavut Government offices. In general, educational levels appear to be higher, and a number of smaller households and individuals (Inuit and non-Inuit) are relatively new to the community. Parties are frequent, and many households did not take part in the survey because of this activity. A community health officer reported that concerns about individuals rummaging through the garbage dump for discarded food from the retail stores in the town, led to the establishment of a small food bank.

The survey was conducted in Clyde River and Pond Inlet in September 2000. The weather, typical of early fall, had been windy and cool, but people in both communities had been harvesting country food. The survey was completed in Cambridge Bay in March of 2001, shortly after a major musk-ox harvest had been undertaken to stock the local country food store. The household survey involved randomly selected households completing an oral questionnaire that was about thirty minutes in duration, which was recorded by the researcher and/or community-based research assistants. Sample size was dictated by the standards established by the larger circumpolar survey: 40 households were randomly sampled in Cambridge Bay and Clyde River, and 41 in Pond Inlet, which represented about 15-40% of households in the largest to the smallest communities, respectively.

This study was designed not to measure the volume or value of food and other exchanges, but to know, in no uncertain terms, the contribution of country food versus imported food to northern diets, and the degree to which food and the means of production are shared. The short recall period used for the survey aimed at testing actual behavior rather than relying on memory and, by extension, and at least to a certain degree, perceived behaviors. The survey is based on a probabilistic sample from the three villages in Nunavut. In principle, this sampling method allows a generalization of results from an entire population. In this paper, analyses are based
on general trends measurements, and described as frequencies, averages and percents, but rigorous analyses were not performed to assess whether these results are statistically significant. This approach to analyzing the data was used mainly because the sample size is too small if considered in relation to the nation as a whole. In fact, the data resulting from this study represents a relatively small contribution to an international program in which the same questionnaire and sampling design was applied to other areas of the circumarctic. Statistical analyses can be undertaken on the large database (all regional samples combined), while such analyses are not possible for the Nunavut sample of three villages and 120 households. However, a descriptive analysis can be used to uncover trends, which is relevant at the exploratory stage and that would be indicative of areas that require further research. It is important to keep this limitation in mind as the results are discussed.

Food security, as defined in Canada’s Action Plan for Food Security (Agriculture and Agri-Food Canada 1998), requires elements of accessibility, availability, adequacy, and acceptability. The survey used in the present study was principally focused upon the nature of sharing relationships between households, as a measure of social cohesion (Duhaime and Gominaire 2002). To this end, the survey aimed to capture degrees of accessibility and availability of country food and imported food, by way of questions about food sharing during the week prior to the survey. Follow-up questions allowed the research team to also focus on annual participation in production and consumption of country food, which provided additional insight into aspects of access, availability and acceptability of food in Nunavut communities. Adequacy was not measured.

The Changing Food-Scape in Nunavut and the Arctic

The shift in food use among arctic residents, from country food to imported food has been well-documented (Wein 1986; Kuhnlein 1995; Lawn and Langner 1994; Duhaime et al. 2001). Northern populations have been increasingly exposed to imported foods through availability in retail outlets, advertising, popular culture and education. Increased sedentarization has diverted people from semi-nomadic traditional lifestyles, although they continue to pursue harvesting activities from permanent homes and seasonal camps. Traditional food production and harvesting practices continue to occupy an important place in Inuit culture, but it is clear that this is changing in certain ways. Almost all those surveyed reported purchasing imported food during the week in question for the survey.

An increased orientation toward wage-labour amongst northerners, and cultural changes brought about through television and other media exposure, may be contributing, at least in part, to a growing inclination, in particular among young people, to consume imported food (Wein 1986; Wein et al. 1996). However, Condon et al. (1995) found that as these young people grow older, and take on family responsibilities, their involvement in harvesting activities increases. Collings et al. (1998) further reported the continued importance attached to traditional foods even by young people’s households, and values regarding both consumption and sharing of Inuit foods.

Shopping patterns suggest a preference for convenience foods, with the result that most imported food consumption consists of frozen prepared foods, which require little or no preparation and fit well with Inuit tradition (Lawn and Harvey 2001). Individuals are busy with work, family and community obligations.
Furthermore, fresh produce is not only expensive by the time it reaches arctic retail stores, it is more susceptible to spoilage; frozen prepared foods are more reliable. Lawn and Harvey (2001) found that fruit and vegetable consumption in Pond Inlet was more likely to be observed in more affluent households—but considered a luxury for many. When raw meat constituted the major part of the Inuit diet, a lack of fruit and vegetables would not have been an issue, but now that store-bought food accounts for a greater portion of the diet, the resulting vitamin deficiency is more critical. As with southern Canadians, nutritional knowledge is relatively poor, and combined with pressure from advertising, education, lifestyle, self-image and food quality, imported fast foods have become a more appealing choice for Inuit.

It is quite evident that the diet of arctic peoples today has higher concentrations of refined sugars and saturated fats as compared to the traditional diet, which provided more protein, vitamins and minerals. Recent studies suggest that a large proportion of the calories, sodium, and certain micronutrients consumed by Inuit populations are derived from imported foods (Lawn and Harvey 2001; Wein 1986; Kuhnlein et al. 2001). If imported foods are primarily processed or ‘junk’ foods that are high in fat, sugar and salt, they would inevitably represent the major source of calories. In fact, the introduction of imported foods has resulted in many nutrition-related health problems—anemia, obesity, dental caries, heart disease, to name a few. Country food remains a key source of protein, vitamins A, B, C and D, iron, retinol, zinc and other minerals (Wein 1986; Kuhnlein and Soueida 1992). Furthermore, country food has also continued to hold real importance as a defining component of Inuit identity, as a favoured source of nutrition, and as an important ‘social cement’ that binds people together in sharing and support networks (Duhaime and Godmaire 2002). While there is evidence that food consumption patterns have changed in response to availability, food preferences persist in the continuum of a complex interplay of socio-cultural influences, as well as family, personal and community values (Lawn and Harvey 2001).

Country food production is affected by a number of factors. Seasonal access to wildlife and fish resources is key; some communities face more obstacles due to weather than others, but in most communities, harvesting can be undertaken year-round, with a potential hiatus during sea-ice break-up or freeze-up. A principal obstacle, especially for communities where wage employment opportunities are scarce, and therefore also disposable income, is the cost of harvesting; fuel and equipment acquisition and maintenance are expensive (Wenzel 1995; Lawn and Harvey 2001). Thus, access to monetary income can be a critical factor in country food production, harvesting, and consumption.

A fairly common household strategy is for one partner to engage in wage-employment, which then subsidizes the other partner’s harvesting activities. A lack of money to support harvesting activities and to purchase imported food products is a major issue—80% of households in Pond Inlet reported running out of money for food (Lawn and Harvey 2001), and many reported not having enough food at the time of the survey. In the present survey, a number of respondents reported that they harvested only seasonally because they lacked a key piece of equipment—a boat or skidoo, for example. Condon et al. (1995) found that access to the means of production (equipment acquisition) increased the level of harvesting and thus access to country food. For this reason, traditional Inuit sharing systems are important even today, despite changing economic conditions and lifestyles.
Figure 1. Nunavut Community Results: food consumption
The presence or absence of male hunters in the household may affect access to and use of country food. While women may hunt and fish, men are assumed, more typically, to be the active harvesters. Indeed, Lawn and Langner (1994) and Duhaime et al. (2001) suggest that the presence of a male head of the family, available for production activities, and backed by a favourable economic situation, strongly influences access to country foods. In short, households that combine both employment income and hunting activities are better able to support the costs of both country food and imported food.

Inuit culture values the sharing of food—indeed, in the past, it was dependent upon such systems, and sharing continues to be a common practice (Freeman 1996; Wenzel 1995; Collings et al., 1998). In some regions, community freezers provide a way to share produce between hunters with an excess and consumers with a need. This is more common in Nunavik than in Nunavut. In the latter case, sharing has traditionally occurred according to certain family and social relationships, and according to identified need. Now that Inuit families are living in more nucleated households (often in different communities), as hunting practices and partnerships change, and as cash income becomes more dominant than harvesting ‘income,’ the question is whether sharing will continue to fill the gap.

RESULTS

Harvest Participation
More than half of the households interviewed in the present survey (60% in Cambridge Bay, 65% in Clyde River, and 68% in Pond Inlet), reported that they participated in harvesting activities during the year. Six respondents in Clyde River reported that they only harvested seasonally; in most cases, the reason given was the lack of a boat. One respondent in Cambridge Bay reported that they participated in summer only. Others most often participated in fishing.

If cost can be said to be a key determinant of participation, it should follow that wage-employed Inuit are more likely to be actively involved in harvesting than the non-employed. On the other hand, without the constraints of a wage-paying job, it may be easier for those without regular work hours to undertake hunting, particularly if they can be supported by a spousal income, or loans of money or equipment from others. While other surveys reported a lack of money as a critical reason for many Inuit not to harvest country food, this survey did not address this specifically through direct questioning. However, the impact of a lack of disposable income can be deduced from other indicators—for example, employment status or main source of household income, size of household, etc.

In fact, it was only in Clyde River that there was a major difference between the harvesting rates of the two groups: those whose main income was not derived from wage employment were most active harvesters during the survey week—71%, versus 55% of employed respondents. In Pond Inlet, the ratio was 69% of non-employed to 74% of employed; in Cambridge Bay, it was 74:78%.

Furthermore, in Clyde River, 75% of the households that gained income from wage employment reported receiving country food, whereas only 47% of the unemployed households reported receiving such gifts. The reverse pattern is reported for Pond Inlet and Cambridge Bay, where the households without wage employment
received country food more often than those with wage employment (81:74% and 78:63%, respectively).

Do wage-employed households subsidize the country food production undertaken by non wage-employed households? Wenzel (1995) reported a major reduction in the sharing of harvesting equipment, gasoline and money among Clyde River Inuit since the early 1970s, despite pressures on more ‘wealthy’ households to share with their kin. Very few respondents in this survey reported such sharing practices in any of the communities surveyed (Fig. 1). Donating money or equipment to support country food production was reported in fewer than 20% of the households in Pond Inlet, and fewer than 10% in both Cambridge Bay and Clyde River. Lending money in support of food production was equally uncommon, although lending of equipment occurred more frequently, especially in Cambridge Bay and Clyde River. It was much more common to give gifts of money so people could buy imported food.

It does appear from the results that in Clyde River, people without wage employment are much more active in harvesting than those with wage-paying jobs, although they shared country food as often as did the employed in the week of the survey (Table 1). In contrast, they were given country food much less often than those with wage employment, and shared imported food less often as well. In Pond Inlet, wage-employed people harvested slightly more often, but they shared and received country food less often; on the other hand, they most often made gifts of imported food to others. In Cambridge Bay, those with and without wage employment participatined actively in harvesting; those without wage income shared and received country food most often, and also shared and received imported food.

Table 1. Income source and effects on production and sharing, by community, as percent (%)

<table>
<thead>
<tr>
<th>Community</th>
<th>Main income source 2</th>
<th>Harvest participation</th>
<th>Give country food</th>
<th>Receive country food</th>
<th>Give imported food</th>
<th>Receive imported food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge Bay</td>
<td>Job (n=19)</td>
<td>74</td>
<td>47</td>
<td>63</td>
<td>33</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Other (n=9)</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Clyde River</td>
<td>Job (n=20)</td>
<td>55</td>
<td>50</td>
<td>75</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Other (n=17)</td>
<td>71</td>
<td>53</td>
<td>47</td>
<td>53</td>
<td>24</td>
</tr>
<tr>
<td>Pond Inlet</td>
<td>Job (n=16)</td>
<td>74</td>
<td>63</td>
<td>74</td>
<td>63</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Other (n=19)</td>
<td>69</td>
<td>56</td>
<td>81</td>
<td>38</td>
<td>69</td>
</tr>
</tbody>
</table>

1 This table represents Inuit survey participants only.
2 Paid job/business versus ‘other’—Social Assistance, Old Age Pension, Student Support.

Kruse (1991) found in Alaska that, contrary to certain expectations, involvement in wage-employment and education did not necessarily undermine harvest participation. An increase in labour force participation, in fact correlated to increased income and number of households who obtained over half of their food supplies from subsistence activities. The same observation applied to Nunavut; as described above, in two of the study communities, those with wage employment harvested at similar rates to those without. The variations in the levels of harvest participation in Clyde River is therefore significant, and deserves further exploration.
Table 2 Age-related patterns in harvesting, employment and food sharing, as percent (%) ¹

<table>
<thead>
<tr>
<th>Community</th>
<th>Age</th>
<th>Harvest participation</th>
<th>Give country food</th>
<th>Receive country food</th>
<th>Give imported food</th>
<th>Receive imported food</th>
<th>Give money for production</th>
<th>Give other items for production</th>
<th>Give money for imported food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge Bay</td>
<td>20-30 (n=9)</td>
<td>56</td>
<td>44</td>
<td>89</td>
<td>33</td>
<td>22</td>
<td>11</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>31-65 (n=16)</td>
<td>69</td>
<td>56</td>
<td>56</td>
<td>44</td>
<td>50</td>
<td>6</td>
<td>6</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>66+ (n=3)</td>
<td>100</td>
<td>100</td>
<td>67</td>
<td>33</td>
<td>67</td>
<td>33</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>Pond Inlet</td>
<td>20-30 (n=9)</td>
<td>67</td>
<td>56</td>
<td>89</td>
<td>33</td>
<td>44</td>
<td>11</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>31-65 (n=22)</td>
<td>73</td>
<td>64</td>
<td>73</td>
<td>59</td>
<td>50</td>
<td>9</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>66+ (n=4)</td>
<td>75</td>
<td>50</td>
<td>75</td>
<td>50</td>
<td>25</td>
<td>75</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Clyde River</td>
<td>20-30 (n=12)</td>
<td>67</td>
<td>17</td>
<td>42</td>
<td>50</td>
<td>58</td>
<td>8</td>
<td>8</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>31-65 (n=23)</td>
<td>65</td>
<td>70</td>
<td>65</td>
<td>72</td>
<td>48</td>
<td>0</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66+ (n=2)</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

¹ Inuit respondents only
Likewise, level of education in general seems to support continued participation in harvesting—100% of Inuit in Cambridge Bay and Pond Inlet with post-secondary education reported that they participated in harvesting (none of the respondents in Clyde River had more than high school education). In Cambridge Bay and Pond Inlet, Inuit having education levels of grades 1-8 harvested in 67% and 70% of cases, respectively; in Clyde River, the rate was 58%. Sharing rates differed only slightly between those with grade school or high school education.

**Sharing Relationships**

Sharing relationships are an important way to ensure community stability and quality of life, as well as social connections and family solidarity. Such sharing was clearly evident in our community surveys.

In all household types, family members were key partners in the sharing of country and imported food. The exception was in Pond Inlet, where in households comprising 1 or 2 persons, friends were most commonly reported as giving and receiving country food. In Pond Inlet, neighbours were seldom reported as sharing country food, except in small numbers by the largest households; neighbours were more often engaged in exchange networks in Cambridge Bay and Clyde River. Some, but relatively few, reported exchanging food with family in other communities—however in Cambridge Bay, respondents reported giving both country and imported food to family members elsewhere. In Clyde River, a community association provides school breakfast (17% of the 3-4 person households, and 36% of the households with 5 persons or more reported this source of imported food), and in Cambridge Bay an elders’ society had recently held a feast. Therefore, community associations play a minor, but not insignificant role.

**Social and Demographic Changes in Nunavut and their Effects on Food Production**

Populations in Nunavut have undergone a relatively rapid (50 years) transition from a nomadic or semi-nomadic hunter-gatherer lifestyle to settlement in communities. People no longer share the same homes with extended family members; in fact, they might not even live close to each other in the community. Although sufficient housing has always been an issue for the growing population, in at least one of the survey communities it seems household sizes are decreasing, as the extended family has been replaced by the nuclear family model. In fact, in Cambridge Bay we encountered several households comprising only one person, and in both Cambridge Bay and Pond Inlet, 16 Inuit households (of 63) comprised 1 or 2 people—a situation almost unimaginable in Nunavut in the past, except in the case of non-Inuit teachers and other professionals from southern Canada. In Clyde River, there were only two such cases; but 11 households had 3 or 4 people, and 24 had five or more.

One would expect that larger households would participate more often in harvesting. This does seem to be the case in Pond Inlet and Clyde River, but not in Cambridge Bay where it was the smallest households that were the most active. In Clyde River and Pond Inlet, the largest households most frequently reported giving and receiving country food in the week of the survey, perhaps indicative of the super-families model proposed by Wenzel and White (2001).
Single parent families—Another feature of the changing social milieu in Nunavut is the number of single parent families: they comprised 18%, 22% and 10% of the household samples in the small, medium and large communities, respectively. Our results are somewhat contrary to those found in Nunavik (Duhaime et al. 2001). In Clyde River and Pond Inlet, 44% and 57% of households, respectively, participated in harvesting—in most cases, these respondents were not wage-employed. In all communities, single parent families were involved in country food sharing networks. They gave and received imported food almost as often, but much more frequently in Clyde River, less in Cambridge Bay, and least often in Pond Inlet. The most common sharing partners were family and friends, in that order. For a significant number of single parent families, 50% or more of their diet consisted of country food: 86% in Clyde River, 89% in Pond Inlet, and 50% in Cambridge Bay. Clearly, the absence of a male harvester in Nunavut households in the survey sample did not undermine country food consumption; all single female households consumed country food and most participated in harvesting and sharing.

Youth, middle-aged and elder participation—One of the key changes in the Nunavut demographic is the increasing proportion of the younger population. The assumption would be that younger people are less involved with or committed to the harvesting economy, and therefore one might expect country food harvesting, consumption and sharing rates to be lower in these age groups.

In fact, in Clyde River and Pond Inlet at least, younger people appear to be actively involved in harvesting—at rates similar to middle-aged respondents (Table 2). In Clyde River, harvesting activity seemed to decrease with age, while in Cambridge Bay, the elders in the survey were the most active (however, the number of elders who participated in the survey was small, so the results may not be indicative). Elders in all communities are also, clearly, those who were most committed to providing money or equipment in support of country food production. In all communities, the middle-aged groups were most active in sharing imported food; in the two smaller communities, the middle-aged groups also shared country food most often, but in Cambridge Bay, this role was undertaken by the elders. Youth in Cambridge Bay and Pond Inlet reported receiving country food more frequently than other age groups, but in Clyde River this was not the case, at least for the survey period—only 42% of the youth interviewed reported receiving country food, compared to 100% of the elders. Younger people in this small community more commonly reported receiving and giving imported food.

Sharing networks become more extensive and complex with age: young people (aged 20–30 years) most often exchanged food with family, less so with friends. For all age groups, family members are the most common sharing partners, but the middle-aged or older groups also reported sharing with neighbours and visitors. Elders reported giving country food in 83% of cases, and giving to and receiving country food from family members at similar rates; they also often reported giving country food to neighbours and friends (67% of respondents), but receiving it only half as often from those sources. Younger people also received country food from family in 81% of cases, but gave it in only 55% of cases. In summary, middle-aged and older people are more active in country food sharing networks, both in terms of giving more often and with more people. Elders most
often reported receiving country food from their families, less often from neighbours, visitors and friends; however, they actively provide country food to others.

**Mobility**—A last, but noticeable change in Nunavut is the extent and frequency of mobility between communities; young Inuit move for work or other social/family reasons. Many non-Inuit also move throughout Nunavut for work opportunities; they will be discussed separately, and later in this section.

The mobility rates of Inuit sampled in the survey vary between communities; none of the respondents from Clyde River had been there less than 5 years; 8% of Pond Inlet respondents had been there less than five years; and 25% of the respondents from Cambridge Bay had been there less than five years; most had lived there for less than two years.

New households are understandably more often involved in wage-employment. In Clyde River, those few people who were new to the community were non-Inuit employees from southern Canada. For 41% of the remaining, long-term Inuit residents, the main source of household income was wage employment. In Pond Inlet, all Inuit interviewed, who had been there for less than two years, were wage-employed, whereas only 50% of those who had been there five years or more reported wage employment as the main source of income for their household. In Cambridge Bay, 60% of Inuit interviewed who had been there less than two years were wage-employed, and all lived in households where wage employment was the main source of income. About the same number (67%) of those who had been there five or more years were wage-employed and in households where wage-employment was the main source of income. These relative employment rates are indicative of mobility of Inuit for wage employment, and as a corollary, the structural unemployment of long-term residents in arctic communities. Cambridge Bay is booming with economic, government, and therefore wage-employment opportunities, as well as schooling programs. Pond Inlet has benefited from more recent decentralization of Nunavut’s Department of Sustainable Development, and can expect another influx of civil servants. In Clyde River, there is no such anticipated economic development or opportunities.

Harvesting, and therefore access to country food is be expected to be more difficult for newcomers, who may not know the best locales and times for hunting or fishing, unless they have family or friends who can provide such knowledge. In Cambridge Bay and Pond Inlet (the only survey communities with new residents), newcomers harvested less frequently than long-term residents. In Cambridge Bay, newcomers gave and received country food less often than long-term residents, but in Pond Inlet, the pattern was reversed. Country food consumption increased with time in the community; in all communities, those who had been there longest were most likely to report that more than 50% of their diet consisted of country food.

Sharing relationships evidently become more extensive and complex as time in the community increases, when the situations of those relatively new to the community (less than 2 years) are compared with those who have lived there longer (5 years or more). In Cambridge Bay, for example, newcomers reported more sharing connections with friends than with family, having received country food from friends in two-thirds, and family in the community in one-third of the cases. In Pond Inlet, those new to the community gave country food to family in one third of cases, receiving it at the same rate from family, but also from friends and neighbours.
Long-term residents gave country food to family at similar rates in all three communities. In this group, family is more frequently mentioned as sharing partners, friends much less so, and neighbours or family in other communities are also part of the sharing networks. In Cambridge Bay, friends and neighbours were much less involved in country food sharing with long-term residents than with newcomers, although they still formed part of the sharing network; family exchanges were most frequent. In Pond Inlet, on the other hand, longer-term residents were more involved in country food sharing with friends and neighbours than newcomers, although family sharing was also more prominent. Among longer-term residents, Pond Inlet residents shared much less often with neighbours than those in Clyde River or Cambridge Bay.

Non-Inuit residents—In some Nunavut communities, the predominance of the non-Inuit population raises some interesting implications for food production and sharing patterns. Iqaluit, the largest centre and seat of the Nunavut Government, is witnessing rapid growth and turn-over of the non-Inuit population. A partial survey was conducted in Iqaluit for this study, before it was determined that the results would not contribute to an understanding of the Nunavut situation. However, the exercise did provide some startling insights. One of the most important revelations was that many of the new, non-Inuit residents were unaware (at best), and unsympathetic (at worst), of the country food harvest, several stating that they ‘would never eat it.’ The dynamic of this cross-cultural influence and demonstration effect, coupled with the impacts of accelerated development, lead us to question the long-term viability of the country food harvest and sharing in this community.

On the other hand, in Pond Inlet and Cambridge Bay, there are a considerable number of non-Inuit households, some having been there for up to 25 years. These residents are often active supporters of, if not participants in, harvesting activities. It is these residents who also report lending money or equipment to support country food production, although there were variations among the communities. None of the non-Inuit respondents from Clyde River reporting loaning money for country food production, however one did report lending money for imported food purchases. In Cambridge Bay, two of twelve non-Inuit respondents reported lending money for country food production. Three of this group loaned equipment or other items to support country food production, and five loaned money for imported food. In Pond Inlet, one third of non-Inuit respondents loaned money for country food production in the previous week and one reported lending equipment or other items. One third of the group also reported giving money to support country food production and one third reported giving money to support purchases of imported food. Although these results are based on a small group of respondents, they nonetheless suggest an interesting potential pattern: along with Inuit elders, non-Inuit residents of smaller communities may be contributing to the support harvesting activities, as well as imported food purchases, through gifts or loans of money and equipment.
Chapter 4: Food Production and Sharing in Nunavut

ANALYSIS

Availability, Accessibility and Acceptability
Has Nunavut achieved the ‘Three As’ of Food Security—availability, accessibility and acceptability? The answer, of course, must be considered in light of the different qualities of imported food and country food. Imported food is purchased and consumed by almost everyone in Nunavut, as reported in the household survey, but the quality and nutritional value of that imported food may not be very high, although the cost generally is. Still, imported food is available, and accessible within the limits of cash resources, and it is apparent that sharing practices include imported food, in some cases more often than country food. The survey did not specifically seek input on food acceptability, although many comments were made by survey participants about the poor quality of store produce. Some adults also reported that their children preferred the taste of imported food.

Country food is also consumed by almost everyone in Nunavut. It appears to be broadly available to at least some degree, either through direct harvesting, or through sharing networks between households; few survey participants reported buying country food. Sharing of country food was reported by over half the households in the survey; slightly more respondents were on the receiving than the giving end. Country food was given as frequently as imported food, while imported food was less often received than country food.

Accessibility was often affected by ownership of, or the cost of operating equipment, by seasonal or weather conditions, and by sharing networks. Accessibility was often curtailed by the costs of outfitting harvesters; however, a clear pattern did not emerge to indicate that non wage-employed residents or large households had difficulty either harvesting or sharing. For a few households, especially in Clyde River, the lack of equipment constrained them to certain seasons for harvest.

Finally, acceptability was not addressed directly in the survey, but respondents provided some insights from their comments. According to consumption rates, country food is more acceptable to older respondents than to youth, but it is still acceptable for many in the younger age groups.

Community Patterns
In Clyde River, country food consumption was most frequent, country food sharing was less common, but gifts of imported food were the most frequent of any of the communities surveyed (Fig. 1). As well, one third of the households reported giving money for imported food purchases. It may be that where country food is not available, as is the case for many Clyde River households, giving imported food or money for imported food purchases is a way to continue the sharing networks. Indeed, non wage-employed residents in Clyde River gave and received country food less frequently than those who were wage-employed, but reported giving imported food more frequently. Compounding the lack of a cash income and equipment for many residents, only a few loans of equipment or other items in support of country food production were reported. Gifts of money or equipment, and/or loans of cash for country food production were seldom reported. This community also had the highest average household size; residents of 31-65 years of age had an average 6.9 people in their household. Among these households, 48% reported wage-
employment as the main source of income. The middle-aged and older households in Clyde River received country food most frequently, and also gave it most frequently, suggesting that this demographic may be the locus of extended family sharing.

In Pond Inlet, more people reported participating in harvesting on a regular basis; they were also the most active givers and receivers of country food among the communities sampled. In addition, all Pond Inlet respondents reported purchasing imported food, a percentage that is slightly higher than the other two communities, where a few respondents did not purchase store food. Pond Inlet also reported most frequently giving money or equipment to support country food production undertaken by others. Middle-aged households were most often involved in giving country food, while younger households most often received it in the week of the survey.

A similar pattern also occurred in Cambridge Bay—younger households received country food more often, while 100% of older households were involved in giving country food. Ironically, this larger, more economically integrated community revealed patterns similar to the small, traditional community—i.e., the same frequencies of sharing country food and receiving imported food—although respondents reported the lowest rate of participation in harvesting activities. People in Cambridge Bay also reported, slightly more often, loaning equipment or other items to others for country food harvesting. Cambridge Bay respondents were the only ones who reported having borrowed or loaned food—a concept that was flatly rejected in the other communities. Households were also most likely to report giving money to others for the purchase of imported food.

Influencing Factors
Differences in employment and education opportunities in communities may influence the degree of country food harvest and sharing. Higher levels of education have been associated with fuller harvest participation, although in Cambridge Bay and Clyde River those who had completed high school harvested less often than those having a grade 1-8 level of education. Having income from wage-employment as the main source of income for the household, was seen to inhibit country food production only to a minor degree, and noticeably only in Clyde River. As a general rule, 67% of those with wage-employment as the main source of income reported harvesting, compared to 71% of those without employment. Further, those without wage employment tended to give and receive country food more often than those with employment income.

Other demographic changes in Nunavut have impacted country food harvesting activities and sharing networks. The rapidly growing youth population shows clear signs of incorporating more imported foods in the diet; at the same time,
this group also actively harvests country food, and receives much of the country food—as well as imported food—as gifts. The middle-aged group in the survey are generally more actively involved in producing and giving country food, and in all communities, respondents from middle-aged households most frequently report giving imported food. Elders are the most devoted consumers of country food and also most likely to contribute money or other items for country food production. Overall, they give country food in two thirds of cases, but give (and receive) imported food in only one-third of cases. Seventy-eight percent of elders reported that they had received country food in the previous week, suggesting that they are being looked after by family, friends and neighbours. There are some subtle differences between communities—in Cambridge Bay, both young and older residents receive country food at a similar rate; in Pond Inlet, almost all the young people surveyed reported receiving such gifts while only three quarters of elders did; in Clyde River, less than half of the young households reported receiving such gifts, while all of the elders did.

Single parent families are relatively numerous but they are included in country sharing networks. They reported a relatively high rate of country food consumption, and participated in active exchanges of both country food and imported food, receiving it most often from family and friends.

Mobility patterns have also impacted harvest and consumption—newcomers to a community seemed to participate less frequently in harvesting for the first few years, but there also seemed to be differences in their involvement in sharing networks. New residents in Cambridge Bay shared less often than longer-term residents, while in Pond Inlet, newcomers were quite involved in sharing networks. Sharing relationships diversified and broadened with time in the community. Friends were more common sharing partners than family for newcomers in Cambridge Bay. Longer-term residents were most involved in sharing relationships with family, but in Pond Inlet, long-term residents are also more involved in country food sharing with friends and neighbours. An interesting side-bar is the role of non-Inuit wage-earners in the survey communities. Their contributions to supporting (and participating in) the harvest are potentially significant, but the sample size in this survey was too small to draw firm patterns.

**CONCLUSIONS**

Nunavut communities are experiencing (sometimes significant) change, but country food production and consumption continue to play an important role despite an increasing use of imported foods (Fig. 1), and the sharing of these two food sources continues to cement social networks. While the study design adopted for this project limits our ability to draw definite conclusions about the rates and volumes of food production, consumption and sharing, the results do suggest patterns that warrant further study.

The survey results from three Nunavut communities suggest that country food harvesting and sharing are actively pursued, regardless of the size or economic diversity of the community. Sharing involves not only country food, but also imported food, and to a lesser extent, money and equipment necessary to produce country food or buy imported food. Involvement in harvesting is not particularly inhibited by employment, and it seems that, overall, it is those without wage-
employment as a main source of income who give and receive more country food, and those with wage-employment who give and receive more imported food. While this does not refute the findings of other surveys (that a lack of money is a critical reason for many Inuit not to harvest country food), it does suggest that many residents are finding ways to harvest and share, despite a lack of employment income. Furthermore, giving or loaning money and/or equipment or other items has been shown not to be an important source of support for country food production.

A significant number of people reported that 50% or more of their diet consisted of country food, which bodes well for nutrition and health. Ironically, in Clyde River, a school breakfast program features imported foods from a southern distributor, obviously an important source of nutrition for families (especially the larger households) that might be lacking resources. Interestingly, in this relatively traditional community, 20% of the respondents reported that their children eat or prefer imported food. However, despite the presumed increasing importance of imported foods to younger Inuit in Nunavut, food sharing patterns still show a preponderance of country food exchanges over imported foods, except in Clyde River, where receipts (and gifts) of imported food were more frequent than those of country food.

The sharing of food and, to a lesser degree, the traditional means of production (harvesting), is actively pursued in the three Nunavut communities of this study. Fifty to sixty-eight percent of households reported participating in harvesting activities during the year; 50-60% reported giving country food in the survey week; and 60-72% reported receiving country food—obviously, the discourse about sharing is also the reality. Furthermore, the sharing of imported food is almost equally important: 50-65% reported giving imported foods in the week of our survey, while 45-51% received imported food.

Though there may be minor differences between communities, it can also be said that despite the variables (location, resource-richness, community size, levels of economic activity or diversification), the similarities between communities are more striking. As Nunavut communities change, with more Inuit engaged in wage-employment, more frequent mobility, and an increase in nuclear or single-parent families, country food production and the sharing of both country and imported food continue to be vital to food security.

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Chapter Five

Assessing Food Insecurity in the Arctic: An Analysis of Aboriginal Household Coping Strategies

Marcelle CHABOT

INTRODUCTION

Unlike in many developing countries, food distribution mechanisms are rarely lacking in industrialized countries where there is a wide range of supply sources. Despite major issues about food quality and safety, as evidenced by the crises that affect the agri-food industry, there is an overwhelming assumption that food will always be available in the western world. Even though the majority of Canadians have been free from hunger in recent years, in 1998-1999 an estimated one in ten Canadians experienced episodes of food insecurity at some point during the year and one third did not have enough to eat. In other words, 10% of the population is unable to obtain sufficient, nutritious, personally acceptable food through normal food channels or is uncertain about being able to do so (Davis and Tarasuk 1994, in Rainville and Brink 2001:4).

In industrialized countries, where the market plays a crucial role in the production and distribution of food commodities, the ability to access or secure accessibility of food is largely determined by buying power. Poverty, on the other hand, generates uncertainties and contributes to a lack of food security. In fact, analyses indicate that low income greatly increases the likelihood of food insecurity. Inuit, Métis and members of First Nations have a lower income on average or a higher incidence of low income compared to non Aboriginal Canadians (Statistics Canada 2003); hence are among the most-at-risk segments of the population for food insecurity (Che and Chen 2001; Rainville and Brink 2001). These two studies, which aimed to measure the incidence of food insecurity among Canadians, only considered Aboriginal populations not living on reservations, which

1 This study stems from a research project on the food security of low-income households in Kuujjuaq funded by the Nunavik Regional Health Board of Social Services Community Health Research Program, in partnership with the Corporation of the Northern Village of Kuujjuaq. This original research was also supported by the Fonds québécois de la recherche sur la société et la culture through a postdoctoral fellowship at the Scott Polar Research Institute at the University of Cambridge (UK). I want to thank Robin Stone, dietician, for her comments and help to improve the quality of the final version of the manuscript. Contact: marcelle_chabot@hotmail.com.
Arctic Food Security

comprise a large proportion of Aboriginals living in urban locations, and excluded Yukon, Nunavut and the Northwest Territories. In isolated regions of Northern Canada, stores are not the only sources of food supply: household country food production provides a substantial quantity of food resources, and community networks represent an alternative source of food supply (e.g., Wein and Freeman 1995). In Arctic regions, that are of particular interest for this paper, these two factors contribute to household food security along with others, such as monetary resources (Duhaime and Godmaire 2002). The question that arises is: in such regions, does income have a lesser influence on food security and insecurity as compared to the rest of Canadian population?

First, country food production can be seen as a significant factor for food security in Canadian Inuit communities. For instance, about half of the protein intake of Inuit is derived from country food (fish, fowl and mammals), hunted or fished locally by Nunavik individuals and households. Daily consumption of country food by Inuit is between 170 and 365 grams, depending on age and gender (Lawn and Langner 1994b). But, country food production is dependent on diverse factors over which Inuit have little control, such as the relative abundance of species, ecosystem health, natural events induced by climate change, contamination, etc. Furthermore, seasonal fluctuations of species have a major impact on food supply and access, as reported in nutrition studies (e.g., Bégin and Parent 1995; Kuhnlein et al. 1995). At certain times of the year, such as at the end of winter, country food is less available and the most vulnerable groups, especially those who do not produce their own food, are at greater risk for food insecurity.

Access to country food also depends on the availability and skills of a hunter living in the household. Thus, the absence of an adult male in the household was one reason respondents from two Nunavut communities in the Lawn and Harvey (2001) survey lacked access to country food. A later study by Duhaime et al. (2002) also confirmed this conclusion: the presence of a man in the household increases the proportion of country food in the diet.

Access to country food, just like imported food, is also largely determined by disposable income. For instance, it was found that job occupation, as an income indicator, influences access to country food. In fact, the household consumption of country food was found to be directly proportional to the availability of money to purchase and operate the equipment required to procure it (Duhaime et al. 2002). This has been partly corroborated by the results of an investigation by Lawn and Harvey (2001), who reported that the lack of funds to buy and operate a vehicle was the main barrier to sustained access to country food for a significant proportion of respondents (3%-10%). It should be noted that production costs in these remote regions are very high (e.g., Wenzel 1991).

Second, access to a community network of mutual assistance by family members and neighbours, or customary sharing practices, is often considered another main factor for food security, notably for people who procure little or no country food themselves. However, recent findings reveal that social networks might be limited as a means to alleviate food insecurity. In fact, Dewailly et al. (2001) found

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2 See Blanchet et al. 2002 for a complete dietary profile of Inuit populations around the world.
that people living in single-parent households, living alone, or who reported suffering from at least one chronic disease, were more likely to experience a nutritionally-deficient diet and more frequent episodes of food shortages. A study on poverty in Kuujjuaq (Nunavik) reported that, although poorer individuals and families can obtain help from local organizations or from friends and relatives when they are lacking money or food, some do not eat on a regular basis and might not eat for several days (Vanier and Gray 1998). For some individuals, especially children and the elderly, food obtained through these networks might provide the only daily meal.

The hypothesis advanced in this study is that lack of monetary resources is a key factor in food insecurity despite widespread sharing practices in these communities. For instance, in Nunavik, a particularly high proportion of survey respondents in the 1992 Santé Québec inquiry (38% from Hudson Bay region communities) reported experiencing food shortages (Delisle et al. 1994). A study in Nunavut revealed that 80% of respondents did not have enough money to buy food, and over half of those had experienced at least two food shortage episodes in the month prior to the survey (Lawn and Harvey 2001). In this paper, it is suggested that lower income explains this apparent widespread food insecurity in these Aboriginal communities. Indeed, recent analyses of the standard of living of the Aboriginal population of Nunavik revealed that 42% lived below the poverty level (Chabot 2004a). On average, food accounts for half the Inuit household budget in this region, whereas other Canadians allocate only about 12% of their household budget for food (Duhaime et al. 1998). In 1993, it was estimated that a four member household receiving employment assistance had to spend up to 93% of its disposable income (after rent) on groceries (Lawn 1993). Such large expenditures would place the most financially vulnerable households at risk of material and food insecurity.

**ASSESSING HOUSEHOLD FOOD SECURITY**

Since the 1970s, the search for an instrument by which to measure household food security in developing countries has progressed from supply-based to nutrition-based, and finally to access-based formulas (Frankenberger and McCaston 1998). Although the range of indicators encompassing all aspects of food security have been worked into a framework (e.g., Maxwell and Frankenberger 1992), no one model has succeeded in accounting for the phenomenon completely or accurately (Maxwell et al. 1999). One of the chief barriers to the development of food security indicators, according to Tarasuk (2001), arises from the confusion between causes (sufficient supply, adequate income, good physical health), manifestation (absence of hunger, enough food) and consequences (adequate nutrition, absence of anxiety about resources). Many obstacles to the implementation of comprehensive models may also be attributed to the instruments of measurement, which can be quite difficult to use, intrusive for the population studied, or unachievable due to lack of data. Various methods and instruments have been developed, tested and refined in North America.

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to measure household food security and insecurity. Here also, the development of a measuring instrument has directed the research. In her review of the literature, Tarasuk (2001) divides the indicators into two types: direct and indirect.

**Direct Indicators**

Direct indicators refer to the manifestations of food security or insecurity, i.e., they capture core experiences and behaviours, and recognize their intensity. The author outlines three approaches that focus on the quantitative dimension, reflecting the perception that this is the most important manifestation of food security.

1. The first approach is designed to assess food sufficiency. In its simplest form, the instrument consists of a single question such as: *Did you not have enough to eat?* or *Did you worry that you would not have enough to eat?* This instrument was used in Canada for the National Population Health Survey (Rainville and Brink 2001; Che and Chen 2001), in the Santé Québec survey of the Inuit of Nunavik, and in a series of surveys conducted as part of the Food Mail Program (Lawn and Langner 1994a; Lawn and Harvey 2001). It appears, however, that without a time indicator (duration, frequency, or intermittency), it is difficult to determine the level of food security or insecurity.

2. Other surveys use hunger as an indicator of lack of food security (i.e., a feeling of pain induced by lack of food), while distinguishing among the individual feelings of hunger for each household member. Since children are usually shielded from hunger as much as possible, the experience of hunger in a child reveals severe food insecurity.

3. Finally, in another approach, food security is a managed process whereby the household makes various decisions about how to cope with insufficient resources. In this case, the level of compromise is measured according to the degree of privation, frequency of episodes, and their duration. The ways in which episodes of food scarcity are managed become indicators of food insecurity. It is assumed that those who are food secure do not need to manage such episodes.

The *Food Security Core Module* developed in the United States is another instrument that combines all three approaches so as to distinguish between degrees of severity of food insecurity occurring with and without hunger (Carlson *et al.* 1999).

**Indirect Indicators**

Indirect measures are not as specific and depend on an understanding of their relation to more direct indicators. They usually deal with the causes and consequences of food insecurity. By comparing direct and indirect indicators, probabilistic frameworks can be designed to build a more solid foundation for the interpretation of the findings. Tarasuk (2001) examines three indicators: financial constraints, food bank usage, and the establishment of social programs at the community level. These are briefly described below.

1. There is no simple linear relationship between poverty level and measures of hunger and food insecurity. Thus, socio-economic status is not a specific indicator of food security or insecurity, but rather indicates potential causes. In fact, the availability of food largely depends on income, which is a determining
factor for food security. Although household income by itself conceals many other significant economic factors—access to a sharing network, debt, etc.—poverty seems to be the single greatest risk for food insecurity. Income level measurements are particularly useful in broad surveys that can make use of existing data from official agencies.

2. Food bank usage has long been used as an indicator to measure food insecurity in Canada. However, although all indications are that food bank users suffer from food insecurity, not all those who suffer from food insecurity use food banks.

3. With regard to community-based initiatives and programs for food security (including food banks), statistics show that the number of such projects is continually rising. This does not necessarily indicate a corresponding rise in food insecurity, but these programs make the problem more visible. Consequently, the usefulness of this kind of indicator is limited.

Nutritional status is another indirect measure of food insecurity; however, it is problematic as a measurement because the relationships between variables are not always clear due to various intervening factors that can impact nutritional status (Maxwell and Frankenberger 1992).

All these approaches have certain advantages, but they also have significant drawbacks, and no single measurement alone seems to be sufficient to address the complexity of the issue of food security.

**FOOD INSECURITY AS A MANAGED PROCESS**

Food security is an objective to be achieved but it is also *a situation lived through*, manifested by the absence of any worries about obtaining food. Food insecurity is also a lived experience that encompasses a number of essential aspects where the unavailability of food or money to acquire it, or lack or limited access to food supply, are key components. This approach examination of people’s lived experience will constitute the basis for our analysis.

Food insecurity has been described as a process whereby a household uses a number of coping strategies to deal with the uncertainty of obtaining food (Maxwell and Frankenberger 1992; Maxwell *et al.* 1999; Rainville and Brink 2001; Tarasuk 2001; Derrickson *et al.* 2001). The ability to cope with episodic food shortages is partly determined by the diversity of resources and alternatives available to the household or individual. Many options are available to alleviate food insecurity. The behaviours adopted can be grouped into two broad strategies: those that aim to increase resources and those intended to reduce resource use. The first type includes strategies that aim to generate resources such as money or food. For example, borrowing money from a friend is a frequent, mainstream method, whereas panhandling is an option used in extreme circumstances. Obtaining commercial credit can be a way of increasing resources (although not usually an option available to economically disadvantaged households) despite the fact that indebtedness can compromise or have other consequences for food security in the long term. Delaying rent payments is common, as is selling personal possessions or doing without essentials (e.g., telephone access). Food management strategies such as meal
planning, alternative food choices (different brands, cheaper products), using home made rather than commercially prepared foods, and preventing waste are all cost-saving methods. Accessing food banks, buying in bulk, borrowing or bartering, or even reducing the number of people to feed (e.g., by sending children to eat at a relative’s) are also ways to manage food resources. Strategies that aim to reduce the use of resource represent strategies of deprivation—reducing the portions or quality of food and skipping meals are common options—albeit not viable or sustainable ways to achieve food security.

With respect to Aboriginal peoples, Rainville and Brink (2001) reported that individuals in at-risk households usually rely on a range of coping strategies, and delaying bill payments is the one often used most. Asking a store manager for credit and borrowing basic food items from family and neighbours were the chief strategies used by Inuit respondents from the two Nunavut communities studied by Lawn and Harvey (2001). Making handcrafted articles for sale and going fishing were two other common alternatives.

The process of scarcity management is characterized by the employment of a sequence of actions and reactions by which the household manages the nature and scale of compromises between competing needs and limited resources. The sequence reveals an escalating severity of food insecurity, progressing from worrying about having enough to eat, to compromising on food quality and then quantity, to acquiring food by unusual or socially unacceptable means, or by sacrificing other essentials (Maxwell et al. 1999; Tarasuk 2001; Rainville and Brink 2001). Although geographic and demographic variations affect the order and nature of these strategies, a common model emerges: the greater the severity of food insecurity, the more the household’s members use coping strategies that compromise security in the long term, gradually undermining their overall livelihoods (Maxwell and Frankenberger 1992). For example, urban food bank users often choose to deprive themselves of food in order to keep their apartment (Wilson 2001).

In summary, food insecurity is essentially a process, i.e., a series of actions and reactions whereby a household struggling with shortages of food or resources to obtain food, tries to balance available resources and needs of its members. This process appears to follow a specific path. A study conducted in the United States shows that as food insecurity worsens, household revenue earners will first use strategies to increase resources and gradually adopt strategies that reduce intake (Derrickson et al. 2001). Maxwell et al. (1999) identify a gradation comprising four strategy types that correspond to an increasing severity of food insecurity: first changes in diet are introduced (e.g., eating less preferred but less expensive food etc.), then attempts are made to increase food access on the short term (e.g., borrowing, gifts, wild foods, consuming seed stock etc.), followed by attempts to decrease in the number of consumers in the household on a temporarily basis, and finally, rationing is imposed. Food-rationing strategies (e.g., mothers prioritising children/men, limiting portion size, skipping meals, skipping eating for whole days etc.), are the last resort when all other methods fail.

Furthermore, these strategies are not limited to managing food supplies; they can also impact overall livelihood. For example, a household can deplete its capital or go into debt in order to increase the resources needed to obtain food. These indirect strategies are short-term efforts to cope with food insecurity, and they only
serve to make the household more vulnerable in the future (Maxwell and Frankenberger 1992).

**A CASE STUDY IN NUNAVIK**

The objective of this study is to measure food insecurity by means of direct indicators, namely the coping strategies used by the heads of households facing conditions of food insecurity. In addition, specific influences of a household’s standard of living on the use of certain coping strategies is explored.

Nunavik in Northern Québec (Canada), with one of the highest levels of country food consumption in all of the Arctic, was chosen for the study. More specifically, households were sampled in Kuujjuaq, a community of 2,000 people that has a sizeable non-Inuit population compared to other villages in the region. The non-Inuit demographic has remained more or less steady over the years, varying from 20% to 25% of the population.

The survey was undertaken during the summer of 2002; households and participants were selected from the 1,471 Inuit distributed in 349 households (Chabot 2004b). The majority (57%) of Kuujjuaq households were two-parent families consisting of a couple and their unmarried children, comprising almost five persons per household, on average. Single-parent family units accounted for 20% of all the households, which greatly exceeded the Québec average of 11%. These households were smaller than the two-parent households and a woman was most often the primary economic provider. Multiple-family units accounted for 10% of all the households, and single-person units accounted for 13% of all households.

**METHODS**

The data collection methodology was designed to gather the greatest possible amount of qualitative and quantitative information on income, expenditure and production activities of a sample of low-income households. The objective was to establish the budgets and coping strategies of the heads of households.

**Data Collection**

*Interview guide*—An Interview guide was developed modelled on the guide tested for the 1995 study on the socioeconomic impacts of food chain contamination (see Duhaime et al. 1998). This tool was successfully used to determine the participants' annual expenditures and incomes, including earnings from harvests or other production. It enabled the collection of qualitative data on the context of each monetary and non-monetary transaction.

Personal interviews were conducted with the heads of the household, i.e., the head of the family upon whom the other members appeared to depend. The relationship of dependence was defined by the capacity of certain members to make consumption-related decisions. This capacity is a function of age and role in the family and household (father, mother, child), along with income. In the case of

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4 See Chabot 2004b for more details on the methods.
multi-generational households, the grandparent or grandparents were considered the head or heads of the household. For other types of multi-family households, the principal earning couple was considered as being economically responsible for the other members, and were therefore identified as head of household.

**Questionnaire on coping strategies**—Information on coping strategies was collected by means of a closed-question questionnaire with 25 response choices to the following question: “Which actions have you yourself had to do over the last year to make ends meet when your household was short of money?” This list of strategies was compiled from other, similar enquiries and from our own fieldwork and on-site experience. The questionnaire was not pre-tested.

The questionnaire, provided in English and Inuktut, was given to the heads of households participating in the interviews. The questions related solely to the respondent's situation, and did not seek information on other household members. The interpreter (hired locally) explained the questionnaire contents and often reviewed all of the questions with the respondent.

**Development of the sample frame**—The survey was based on a non-probability sampling of households, a technique used so that low-income households of varied size and composition and with different types of employment held by the heads of households could be selected. In addition, a small number of middle-income and higher-income households were interviewed for comparative purposes. No attempt was made to achieve a representative sample of the remainder of the population.

The low-income households were selected using two lists of individuals who had received financial assistance through the Christmas food baskets and Summer rations programs; the list was obtained from the municipality that manages the programs. These programs were established to temporarily support individuals in great need, based on income level, individual status (adult, child, elderly), or those requiring assisted living (physically or mentally challenged, etc.). Households with higher incomes were recruited using an updated version of the population list that included information on the occupation of the heads of household. Forty-one individuals participated in the interviews, and 43 individuals responded to the questionnaire on coping strategies, representing a total of 29 households. The distribution of certain characteristics of the households and respondents is presented in Table 1.

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5 Recipients were selected by members of the municipal council on a case-by-case basis according to criteria for three poverty levels: no income in the family; one of two parents with a low income; both parents with a low income.

6 Resident list of the village maintained by the municipality.
Table 1. Characteristics of the household sampling

<table>
<thead>
<tr>
<th>Household type by household composition and occupation of head of household</th>
<th>Sampled households</th>
<th>Participants</th>
<th>Sex of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td><strong>Single-family household</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-parent family with unemployed head</td>
<td>6</td>
<td>21%</td>
<td>11</td>
</tr>
<tr>
<td>Two-parent family with salaried female head</td>
<td>5</td>
<td>17%</td>
<td>7</td>
</tr>
<tr>
<td>Two-parent family with salaried male head</td>
<td>4</td>
<td>14%</td>
<td>6</td>
</tr>
<tr>
<td>Two-parent family with 2 salaried heads</td>
<td>2</td>
<td>7%</td>
<td>4</td>
</tr>
<tr>
<td>Single-parent family with female salaried head</td>
<td>3</td>
<td>10%</td>
<td>3</td>
</tr>
<tr>
<td>Single-parent family with male salaried head</td>
<td>3</td>
<td>10%</td>
<td>3</td>
</tr>
<tr>
<td>Single-parent family with unemployed head</td>
<td>1</td>
<td>3%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Multi-family household</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-parent family with unemployed heads</td>
<td>1</td>
<td>3%</td>
<td>2</td>
</tr>
<tr>
<td>Two-parent family with 2 salaried heads</td>
<td>1</td>
<td>3%</td>
<td>1</td>
</tr>
<tr>
<td>Single-parent family with unemployed head</td>
<td>1</td>
<td>3%</td>
<td>1</td>
</tr>
<tr>
<td>Single-parent family with female salaried head</td>
<td>1</td>
<td>3%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Non-family household</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single unemployed man</td>
<td>1</td>
<td>3%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>97%</td>
<td>41(2)</td>
</tr>
</tbody>
</table>

The number in parentheses indicates the number of participants to the questionnaire on coping strategies but who were not interviewed.
Two-parent family households accounted for 62% of the sample, a higher proportion than that found in the rest of the population (57%); single-parent households were also over-represented (24%) compared with the overall level (20%); and single persons were greatly under-represented (4%) compared to 13% among the general population studied. The households and the population they encompassed represented 8.3% of the households and 8.5% of the population (n=125).

Among the sampled households, seven (24%) had not received any financial assistance from the municipality, i.e., neither the Christmas food baskets nor the summer rations. Six households (21%) appeared on one list, and 16 (55%) on both. In all, it has been estimated that 22 out of 28 households (79%) fell below the poverty threshold\(^7\) and included wage earners as well as unemployed persons. The remaining six households enjoyed a fairly reasonable income.

Fieldwork activities—Fieldwork was conducted from June 18 to August 4, 2002. Most of the interviews were carried out with the help of a local interpreter. Potential participants were contacted directly, and once they agreed to the interview, the interpreter or interviewer explained the objectives of the enquiry, the format of the interview, the remuneration (honorarium) they would receive, and their rights as respondents. One or two heads of household were interviewed for each case. For most of the two-parent families, both spouses were interviewed. In these cases, the men tended to answer more of the questions about hunting and fishing activities. When there was no male spouse present, several questions on harvesting and food production expenditures could not be answered. The interviews were tape-recorded and each lasted between thirty minutes and one hour.

Several interviews were also conducted with local business owners or managers, and representatives of local and regional administrative units; none of these interviews were tape-recorded. In addition, many of these interviewees provided the researchers with official lists and other documents.

Data Processing
The tape-recorded information was converted into data files and the quantitative data from the interviews was extracted and collated in computerized form (Microsoft Excel) for later processing. The collected data was processed to generate a graphical representation of the household socio-economic profile, i.e., income, expenditures, production, savings, taxes, and food intake for each household member. This budgetary information was organized into 63 variables.

Budget—The budget for each household in the sample was calculated primarily from the information provided in the interviews; secondary data or that gathered from other interviews for certain budgetary items was also used. Only one interview was rejected due to the difficulty of obtaining valid data. It should be noted that more than one quarter of the households (8/29) had experienced a change in circumstances

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\(^7\) Statistics Canada’s Low-Income Measurements (LIMs) based on the national data were used, to which an amount was added to cover the housing subsidy. For more information, see Chabot 2004b.
in the few months prior to the interview, such as a change in household composition
due to the loss or departure of a spouse or a loss of employment. Incomes were
calculated by taking into account these variations in status when such information
was available. In order to classify the households by composition and occupation of
the head of household, the information supplied by the respondent was applied as
valid for the entire year. The following is a succinct description of the data
processing.

Socio-demographic data—The information gathered on socio-demographic aspects
and the occupation of each household member was usually maintained as such. In
dubious cases, mainly concerning the question of age, the number recorded on the
population list was used.

Monetary income—Monetary income included the following sources: salaries and
benefits (airplane tickets, freight, etc.), social assistance payments, employment
insurance benefits, Canada Pension Plan (CPP) benefits, family allowance, various
compensation payments, hunting, fishing and trapping earnings from the Hunter
Support Program, sales of harvested and handicraft products outside of the Hunter
Support Program, and income from local sources (Christmas food baskets and
Summer rations, rebates from the Landholding Corporation arising from petroleum
product sales, and financial assistance programs undertaken by Makivik
Corporation). Income was usually estimated from the information gathered in the
interview. The net amounts were converted into gross amounts. In certain cases,
secondary data was used or an estimate was calculated based on official
governmental income scales.

Non-monetary income—The calculation of non-monetary income was based on
estimated country food intake per person, according to the data retrieved from the
1992 Santé Québec inquiry, used in Duhaime et al. (1998). This quantity (in grams
per day) was adjusted for the frequency of meals reported by the respondent or
respondents and multiplied by $10 per kilogram of the food consumed, which
represents the approximate cost of the same amount of imported meat.

Grocery expenditures—These amounts included cash outlay for local store-bought
groceries and imported grocery orders. Meals in local restaurants and alcohol were
excluded. In most cases, the amounts reported by the respondent were used; the
information was then converted into annual expenditures.

Data on coping strategies—The questionnaire responses (42 respondents from 28
households) were processed and analysed. The data from one respondent was
omitted from the analyses because it was impossible to reconstruct his budget from
his responses to the interview questions.

The 25 questions were grouped by strategy type according to a list taken from
Maxwell et al. (1999). Some strategies specific to Inuit lifestyles, i.e., food
production, and some strategies associated with the other usual needs were added.
The classification framework is presented in Table 2. It should be emphasized that
this classification was not tested to verify whether it matches the gradation of food
insecurity experienced by Inuit. Moreover, although the notion of essential (and non-
essential) needs accounts for the importance given to production activities, it is not known if it reflects the Inuit perception. Despite these methodological limitations, the determination of household vulnerability to food insecurity will be based on the type of strategies used, particularly the practice of food rationing.

Table 2. Coping strategies and strategy types, Questionnaire, Kuujjuaq 2002*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. CHANGE DIET</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I changed my diet (3)</td>
</tr>
<tr>
<td>-</td>
<td>I cut back on food spending (8)</td>
</tr>
<tr>
<td><strong>2. INCREASE FOOD SUPPLIES</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I asked a friend/relative/neighbour for food (country and store-bought food) (4)</td>
</tr>
<tr>
<td>-</td>
<td>I went to eat at a friend's/relative's/neighbour's (5)</td>
</tr>
<tr>
<td>-</td>
<td>I went to get food at the community freezer to save money (7)</td>
</tr>
<tr>
<td>-</td>
<td>I went hunting, fishing or berry picking (14)</td>
</tr>
<tr>
<td><strong>3. INCREASE NON-FOOD RESOURCES</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I asked someone to pay for food (9)</td>
</tr>
<tr>
<td>-</td>
<td>I borrowed hunting/fishing equipment (18)</td>
</tr>
<tr>
<td>-</td>
<td>I asked someone to pay for gas, equipment or parts (19)</td>
</tr>
<tr>
<td>-</td>
<td>I asked the store manager for more credit (20)</td>
</tr>
<tr>
<td>-</td>
<td>I borrowed money (21)</td>
</tr>
<tr>
<td>-</td>
<td>I asked the Council (CNV of Kuujjuaq) or the government for money (22)</td>
</tr>
<tr>
<td>-</td>
<td>I asked a person living in the house for money (23)</td>
</tr>
<tr>
<td>-</td>
<td>I made carvings or handicrafts and sold them (24)</td>
</tr>
<tr>
<td>-</td>
<td>I sold country food (25)</td>
</tr>
<tr>
<td><strong>4. CHANGE HOUSEHOLD COMPOSITION</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I sent the children to eat at a friend's/relative's/neighbour's (6)</td>
</tr>
<tr>
<td><strong>5. RATION NON-ESSENTIAL NEEDS</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I cut back on my expenses for personal pleasure (11)</td>
</tr>
<tr>
<td>-</td>
<td>I cut back on travelling by plane (13)</td>
</tr>
<tr>
<td><strong>6. RATION ESSENTIAL NEEDS</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I cut back on clothes (10)</td>
</tr>
<tr>
<td>-</td>
<td>I missed a rent payment (12)</td>
</tr>
<tr>
<td>-</td>
<td>I cut back on gasoline (15)</td>
</tr>
<tr>
<td>-</td>
<td>I cut back on vehicle maintenance and repair (17)</td>
</tr>
<tr>
<td>-</td>
<td>I cut back on hunting and fishing equipment and maintenance (16)</td>
</tr>
<tr>
<td><strong>7. RATION FOOD</strong></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>I ate less (1)</td>
</tr>
<tr>
<td>-</td>
<td>I missed a meal (2)</td>
</tr>
</tbody>
</table>

* The number in brackets refers to the order in the questionnaire.

**Limitations**

Data collection and processing employed a series of methodological choices that must be clarified before any significant conclusions can be drawn.
Chapter 5: Assessing Food Insecurity in the Arctic

**Budgetary data**—The first limitation relates to the fact that the findings were not based on a representative population sample. The aim of the data collection was to investigate the behaviour of a sample of households with variable characteristics in order to discern similarities. It must be clearly understood that the relationships revealed or exposed cannot be categorically attributed to households that did not participate in this study.

Reconstructing the household budget involved processing sometimes incomplete or inconsistent data. In a few cases, particularly when the information was provided by elderly individuals, data processing was left to researcher judgment. We believe that this case by case approach is preferred to using a universal model.

The budgetary information on both expenditures and income would by necessity be incomplete. For example, children's expenses and incomes resulting from summer or part-time jobs could have been omitted. However, all data provided by the respondents and other informants was used to describe the budgets as realistically as possible.

The processing of certain budgetary items was based on debatable hypotheses. The calculation used to determine the non-monetary income derived from an assumed value for the annual consumption of country food is a case in point. In this example, however, the methodological choice was supported by other studies, notably Chabot (2001), that used this method successfully.

Another important point concerns the reconstruction of the budget, which presents a static picture of the economic life of Kuujjuaq residents. All changes in the respondents' job situations, socioeconomic status, or household composition were accounted for using the information gathered from the respondents themselves or from secondary data sources.

Finally, the analyses and presentation of the findings are influenced by the small sample size and the need to protect the anonymity of participants. Consequently, the analyses are relatively general and based on aggregated household data.

**Data on coping strategies**—The greatest difficulty encountered in analyzing the data was the variation in interpretation of the questions by the respondents, despite the explanations provided by an interpreter. Several indications convinced us that the respondents did not always associate their responses with money shortages. For example, when a respondent checked yes for the question: I made carvings or handicrafts and sold them, or, I went to eat at someone else's place, it was not always clear whether this strategy was used to cope with a lack of resources or for some other reason. The question was asked only once at the beginning of the interview questionnaire, so the participant could have forgotten that this action was meant to be associated with a lack of money. In some cases, the problem could be clarified using the interview data.

The meaning of the word food presented another problem. The notions of country food, imported food, and food in general could have been confused, even though every effort was made to provide an appropriate translation of the terms in each particular situation in the questionnaire. Thus, a respondent could get (country)
food from the community freezer\textsuperscript{8} because there was no more country food at home, or because there was nothing at all to eat. Or, they might ‘skip’ a meal of country food, which is not the same as saying there was nothing at all left to eat at home.

Other aspects impacting the interpretation of the findings should be explored further. For instance, many of the households underwent changes in circumstances in the year prior to the interview. The extent of the influence of this factor on the answers is not known. Finally, respondents may have neglected to mention a certain strategy used if they were too shy or embarrassed to reveal their problems and how they were resolved.

\textbf{ANALYSES}

The following analyses aim to identify the most commonly used strategies, and to explore possible relationships between selected strategies and two key socio-economic variables namely, total household income and outlay (per person) for store-bought food.

\textbf{Use of Coping Strategies}

The distribution of strategies is presented in Table 3. Strategies were used by at least one respondent in 27 of 28 households; only two respondents from one household had not used any of the strategies.

Of all the actions proposed to cope with cash shortages, borrowing money was the most commonly used. In fact, three-quarters of the households and a similar percentage of respondents had used this strategy during the year prior to the survey. In contrast, changes in diet and asking the municipality for money were seldom used.

All the strategies proposed to increase food supplies were widespread practices, especially accessing the community freezer. It is not certain whether the strategies were used to cope with food shortages of any type or whether they were specifically connected to a lack of access to country food. The most commonly used strategies to increase resources were asking for or borrowing money. Sending children to eat at another home was commonplace, although it was not certain whether this was done in response to a lack of food at home in every case.

\textsuperscript{8} The community freezer is one of the features of the \textit{Hunter Support Program}, funded by the Québec Government and managed by the municipal council. Created as part of the implementation of the \textit{James Bay and Northern Québec Agreement}, the program’s objective is to foster harvesting activities within Nunavik communities to ensure availability of traditional food to everyone, especially those who do not produce or obtain such food. It allows hunters to be compensated when selling their products through the program. Freezers are built in all villages so hunters can dispose of their harvesting products and any community member can help him or herself at the freezer.
### Table 3. Strategies used by respondents, classified by type, 2002 household sampling

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Individuals</th>
<th></th>
<th>Households</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Proportion of</td>
<td>Total</td>
<td>Proportion of</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>individuals (n=42)</td>
<td>n</td>
<td>households (n=28)</td>
</tr>
<tr>
<td>1. CHANGE DIET</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reducing food expenditures</td>
<td>21</td>
<td>50</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>Changes in diet</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>2. INCREASE FOOD SUPPLIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Going to the community freezer</td>
<td>29</td>
<td>69</td>
<td>22</td>
<td>79</td>
</tr>
<tr>
<td>Going hunting/fishing/berry picking</td>
<td>26</td>
<td>62</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>Eating at someone else's</td>
<td>26</td>
<td>62</td>
<td>19</td>
<td>68</td>
</tr>
<tr>
<td>Asking for food</td>
<td>25</td>
<td>60</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>3. INCREASE NON-FOOD RESOURCES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borrowing money</td>
<td>31</td>
<td>74</td>
<td>21</td>
<td>75</td>
</tr>
<tr>
<td>Asking a housemate for money</td>
<td>22</td>
<td>52</td>
<td>18</td>
<td>64</td>
</tr>
<tr>
<td>Asking for more credit</td>
<td>15</td>
<td>36</td>
<td>12</td>
<td>43</td>
</tr>
<tr>
<td>Selling food</td>
<td>12</td>
<td>29</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td>Asking someone else to pay for gas</td>
<td>11</td>
<td>26</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>Making and selling handicrafts</td>
<td>10</td>
<td>24</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>Borrowing hunting equipment</td>
<td>8</td>
<td>19</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Asking someone else to pay for groceries</td>
<td>5</td>
<td>12</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Asking the municipality for money</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4. CHANGE HOUSEHOLD COMPOSITION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sending the children to eat at someone else's place</td>
<td>18</td>
<td>43</td>
<td>14</td>
<td>50</td>
</tr>
<tr>
<td>5. RATION NON-ESSENTIAL NEEDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting back on expenses for personal pleasures</td>
<td>17</td>
<td>40</td>
<td>14</td>
<td>50</td>
</tr>
<tr>
<td>Cutting back on travelling expenses</td>
<td>14</td>
<td>33</td>
<td>11</td>
<td>39</td>
</tr>
<tr>
<td>6. RATION ESSENTIAL NEEDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing a rent payment</td>
<td>24</td>
<td>57</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>Cutting back on gas expenses</td>
<td>17</td>
<td>40</td>
<td>13</td>
<td>46</td>
</tr>
<tr>
<td>Cutting back on vehicle expenses</td>
<td>15</td>
<td>36</td>
<td>13</td>
<td>46</td>
</tr>
<tr>
<td>Cutting back on expenses for hunting equipment</td>
<td>14</td>
<td>33</td>
<td>11</td>
<td>39</td>
</tr>
<tr>
<td>Cutting back on regular expenses</td>
<td>14</td>
<td>33</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>7. RATION FOOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating less</td>
<td>22</td>
<td>52</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>Skipping a meal</td>
<td>14</td>
<td>33</td>
<td>11</td>
<td>39</td>
</tr>
<tr>
<td><strong>TOTAL RESPONSES</strong></td>
<td></td>
<td></td>
<td><strong>416</strong></td>
<td></td>
</tr>
</tbody>
</table>
A good number of individuals reduced expenditures on personal items and activities to cope with shortages of cash. When a respondent from a lower income stratum did not report using this strategy, it may be an indication that their standard of living did not support non-essential needs in the first place. As to the strategies that infringed on essential needs, missing a rent payment was very prevalent among a large proportion of households. The current management of public housing units in Kuujjuaq facilitates this practice, which would be inconceivable in southern urban settings where tenants can be evicted. It is worth mentioning that rent payments are withdrawn directly from the pay-check of most wage-earners, which renders the strategy of missing rental payments nearly impossible.

Cutting back on certain production expenses was also a common way to manage essential needs. The proportion would be higher if only the men, who usually took charge of these purchases, were considered in the survey. Finally, a sizeable number of individuals rationed their food intake, a strategy used by a large number of households. It was not certain, however, whether this was implicitly linked to general food shortages, or whether it could be interpreted as a reaction to a lack of country food. Cutting back on food expenditures was practiced by half the respondents and half the households. The extent and nature of the reductions made are not detailed.

The distribution of the proposed coping strategies reveals the importance of being able to depend on others—family, friends and neighbours—in times of cash shortages. In fact, almost half of the strategies used by at least 50% of the respondents involved asking for help within personal social networks.

The extensive use of certain strategies confirms the role played by community organizations and the use of programs such as the Hunter Support Program (where crafts or food can be sold and accessible at the community freezer) and the public housing program. Private organizations such as general stores (coop or private companies) also play a role as they offer credit, a practice that has been accessible and widely used for decades in the Canadian Arctic.

Individuals also make decisions that do not involve anyone else, such as reducing personal expenditure or food-intake. It was found that more than half of the respondents had rationed their food, affecting more than 60% of the households. It cannot be determined from the survey if this type of strategy is used as a last resort after having asked for support elsewhere, or if it represents a first step before asking for help.

In summary, people use a wide array of strategies that confirm the continued functioning and effectiveness of social networks and sharing practices today, not only within the hunting and fishing economy, but also in the formal market economy. The next section examines the impacts of standard of living on these behaviours.

**Coping Strategies and Standard of Living**
The following analyses strive to understand the influence of standard of living through two independent variables: 1) income; and 2) grocery expenditures, on the dependent variables represented by the number of coping strategies used to deal with food insecurity. The use of grocery expenditures as an independent variable is based on an analysis of Kuujjuaq households showing a link between household income and expenditures for imported food (Chabot 2004b).
First, household incomes (including monetary and non-monetary income) and expenditures for groceries (including local and imported food plus cargo) were adjusted according to household composition and size.\(^9\) Briefly, the annual income distribution per person ranged from $8,850 to $79,600 (before taxes) and the annual expenditure for groceries, per person, varied from $706 to $12,740.

Due to the limited sample size and the limits described previously regarding the interpretation of questionnaire responses, six strategies were selected for consideration according to the following criteria: a) strategies must have been used by at least 50% of the respondents; and b) responses did not present major problems of interpretation, i.e., whether the strategies were used to cope with shortages or for completely different reasons.

The first analysis is based on the total adjusted household income and on the responses to the questionnaire on coping strategies. It uses a test of the equality between the means to verify the hypothesis that individuals with a total adjusted family income below the poverty threshold\(^{10}\) (\(r_1\)) use more of the coping strategies than the higher-income households (\(r_2\)), or hypothesis \(H_1: r_1 < r_2\). The hypothesis is true when \(Z < -1.65\), with a confidence interval of 95%. Table 4 presents the results of the first analysis.

The analysis reveals that four strategies were correlated with income: respondents who eat less to cope with shortages lived in lower-income households. The same relationship holds true for borrowing money, accessing the community freezer, or asking for food.

### Table 4. Coping strategies in relation to total adjusted family income, 2002 household sampling

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Questionnaire response</th>
<th>Test results*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Borrowing money</td>
<td>$18,958 $34,480</td>
<td>-2.06</td>
</tr>
<tr>
<td>Going to the community freezer</td>
<td>18,308 33,541</td>
<td>-2.24</td>
</tr>
<tr>
<td>Asking for food</td>
<td>18,045 30,343</td>
<td>-2.21</td>
</tr>
<tr>
<td>Eating less</td>
<td>17,570 29,022</td>
<td>-2.31</td>
</tr>
<tr>
<td>Asking a housemate for money</td>
<td>20,056 26,287</td>
<td>-1.21</td>
</tr>
<tr>
<td>Cutting back on food expenditures</td>
<td>$21,087 $24,959</td>
<td>-0.77</td>
</tr>
</tbody>
</table>

* Numbers in bold indicate a significant correlation. The value of the number is not an indication of the strength of the relationship.

---

\(^9\) A unit of consumption based on the calculation of adjusted household size: the first adult counts as 1; the others count as .4; each child (under 16) counts as .3, unless the child is living with a single adult, in which case, she or he counts as .4.

\(^{10}\) See note 5.
The findings also show that the less well-off households obtained food from the community freezer or assistance networks more often. This result implies that the more affluent households would be more likely to procure their own (country) food. On the other hand, the tendency of less-advantaged households to depend on others for country food could be explained in part by the fact that there were more single-parent families headed by females in the lower-income group, where less food is usually harvested. Consequently, they are more likely to ask for country food or access the community freezer.

The second analysis used the amount of the budget spent on groceries, adjusted for household size. These amounts were compared with the responses to the questionnaire on coping strategies. As in the previous analysis, a test of the equality between the means was used to verify the hypothesis that the respondents who used the six selected coping strategies spent less on groceries (d1) than those who did not use the strategies (d2). The following hypothesis is obtained: H1: d1 < d2. The hypothesis is true when Z < -1.65, with a confidence interval of 95%. Table 5 presents the results of the second analysis.

A significant correlation between the amount spent on groceries and most of the coping strategies is observed, except for the strategy of reducing food expenditures. The absence of any relationship between food expenditures and this particular strategy is interesting. It suggests that spending less on groceries does not necessarily result from budget cutbacks. In some cases, it can be suggested that the expenditures would already be at the lowest level possible.

Table 5. Coping strategies in relation to adjusted grocery expenditures,* 2002 household sampling

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Questionnaire response</th>
<th>Test results**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Borrowing money</td>
<td>$3,750</td>
<td>$6,047</td>
</tr>
<tr>
<td>Going to the community freezer</td>
<td>3,738</td>
<td>5,722</td>
</tr>
<tr>
<td>Asking for food</td>
<td>2,918</td>
<td>6,460</td>
</tr>
<tr>
<td>Eating less</td>
<td>3,222</td>
<td>5,595</td>
</tr>
<tr>
<td>Asking a housemate for money</td>
<td>3,264</td>
<td>5,549</td>
</tr>
<tr>
<td>Cutting back on food expenditures</td>
<td>$4,026</td>
<td>$4,678</td>
</tr>
</tbody>
</table>

* Groceries include imported orders (including freight costs).
** Highlighted numbers in bold indicate a significant correlation. The value of the number is not an indication of the strength of the relationship.

The links between the amounts on groceries spent and certain strategies, i.e., asking a housemate for money, borrowing money, and asking for food, confirm the importance of social ties. In addition, individuals who spent less of their disposable income on grocery purchases relied on the community freezer for food supplies. This latter finding could, however, be ascribed to the substantial number of female respondents and single parents among the households that spent less on groceries and on country food production. On the other hand, the results reveal a link between grocery expenditures and food rationing. This suggests that, although the community
provides assistance, it appears to be insufficient or not always effective to meet the needs of the poorer households.

**DISCUSSION**

Heads of households manage to secure their food requirements using a wide array of strategies. Although the outcomes of using these coping strategies were not assessed—i.e., whether food shortages were resolved or food security achieved—the study shows that many individuals must also resort to food rationing. This corroborates results from other studies (Lawn and Harvey 2001; Delisle et al. 1994) which state that despite the use of coping strategies, a significant percentage of Inuit households from Nunavik and Nunavut experience food shortages. Unfortunately, the data collected in Kuujjuaq did not serve to determine the frequency and/or duration of such episodes, detect cycles or reveal a sequence of actions that led to an erosion of food security.

Moreover, lower income is correlated with higher food insecurity, as defined by the selected resources management strategies. Generally speaking, this suggests that standard of living impacts behaviour, or coping strategies.

In the following section, these two major results are discussed. The goal is to understand their sociological implications and their impact in terms of food security/insecurity.

**Income and Interdependence**

The analysis suggests that low-income individuals, who appear to be more food insecure, engage in a greater number of interactions with the community in order to meet their needs, compared to higher income individuals who tend to be more self-sufficient. Can it be inferred that income influences social interactions?

Independence, i.e., the ability to rely on one’s own resources, is a characteristic that influences economic behaviour. Independence is an attitude that can be the result of interpretation of objective conditions or socialization. In the investigation into the economic behaviour of Québec families at the end of the 1950s, Tremblay and Fortin (1964) demonstrated that an attachment to traditional values declines as income increases. However, they also found that independence, which was a typical traditional attitude, remained an important characteristic among high-income participants of that study. In this instance, individuals may interpret their objective conditions (i.e., access to resources) as supporting or not supporting independent behaviour. Perception of a situation can also be filtered through individual values, which can be reinforced or not by objective conditions. This theoretical model will be applied in order to understand the behaviour of the respondents to this study.

In Inuit society, sharing is a central element of social relations, and mutual aid is a moral obligation. Traditionally, the food distribution system was such that it ensured survival of poorer families and contributed to balancing the inequalities of production or procurement. One never refused to share food with someone who asked (Saladin d’Anglure 1984). Still today, food is shared with kin, friends, and neighbours. A sense of obligation presses individuals to assist those who cannot procure food for themselves, especially the elderly, sick, widowed, and/or handicapped. There is also an obligation to respond to any requests, especially if
expressed within a subordinate relationship, which may include country food as well as commodities or money (Wenzel 2000). For example, one elderly participant mentioned during the interview that: “I can use my culture, my traditions and ask the neighbours to help me. Now, there is no need to do so because I am not starved and … I can survive. If I become starved, I’ll go ask the neighbours” (Interview no. 15).

The harsh living conditions endured by previous generations of Inuit created a social environment in which individuals were dependant upon each other and it was expected that everyone would fulfill their individual responsibilities. Briggs (2001), describing daily life in camps for the contemporary period, stated that: “In general, Inuit opted for helping and being helped, and valued social responsibility very highly. Contributing to the well-being of one’s family and camp was the purpose that all the independent judgement and self-reliant, autonomous behaviour served.” This suggests that interdependence is a trait of traditional Inuit society.

The fact that low-income participants engage in more interactions with the community could indicate that they are more dependent. In theory, one can presume that these individuals are following a more traditional lifestyle, which would explain their dependency. If this is true, then participants with higher incomes, who appear to be more self-sufficient, would be considered to be less attached to traditional values. Since attachment to traditional values has not been measured explicitly, it is necessary to draw from comments collected in participant interviews to find evidence to test this hypothesis.

An analysis of interviews indicates that there are no low-income participants who were not receiving help or helping someone else despite their limited resources (e.g., with gifts of money or country food). Interdependence appears to be a generalized phenomenon among the respondents: no one seems to have been left out of the equation. This includes young people or even participants showing signs of social problems. As Nuttall mentioned: “There is a recognition that some people are unable to hunt for themselves, possibly because of old age or illness, or even owing to incompetence or laziness” (Nuttall 1992).

Sharing is also a common practice among high-income households; however, a few participants said they had received or given gifts under exceptional circumstances only. Generally, these participants tended to eat little country food. Moreover, they were able to fulfill the household country food needs with their own production, as illustrated by the following comment from a female participant: “We do not give money to anyone. We eat country food once or twice a week and we go to my mother (…) when we eat country food. We eat what we catch. We do not receive country food except maktak and that is once a year” (Interview no. 1). This observation should nevertheless be examined more carefully in order to understand if such attitudes result from a decline in traditional values or from a more or less permanent improvement of material conditions.

The material analysed suggest two demographics: a) a large majority of participants partake in one way or another in a sharing-network, irrespective of income; b) a number of others tend to be more or less self-reliant. The data collected in Kuujjuaq does not provide any evidence that the attitudes observed among a few higher-income respondents are attributable to permanent value change, which would have major sociological implications. Although the question of independence requires a thorough examination, there are indications that strong attachment to tradition is a widespread trait that is shared, at least to some degree, by most of the
participants. This would seem to counter the popular perception concerning Kuujjuaq that, because it is a larger community that has undergone a longer and stronger influence from the non-Inuit population, it is experiencing a type of social disintegration. In fact, at Kuujjuaq, objective conditions and values are mutually reinforced to maintain a significant level of interdependence.

A state of interdependence that serves to keep individuals connected to sharing-networks is maintained through continuous expression of various needs, pressing or not. For example, the majority of the wealthier households sampled procured a rather significant quantity of country food with their own equipment to fulfill part of their needs and the needs of others, while also still depending on others for country food. Busy at work most of the time, wage-earners need to rely on other hunters during certain times of the year. Conversely, as indicated in other studies (e.g., Wenzel 2000), those with a regular income often contribute to the resources of others, especially in the organizational and operational needs of full-time hunters. Households enjoying higher incomes are not at all excluded from the circulation network of food and goods. What distinguishes them from the less affluent households, however, is their role in the sharing system, and that their requests do not result from a vital need. It is the role of the traditional economy in the whole of economic transactions that maintains the sharing system as a thriving and functional component of the system, a fact that has been attested in other parts of the Arctic (e.g., Langdon 1986, Dahl 1989; Wenzel 1991).

Interdependence is also maintained because of the general economic insecurity of Inuit households in Nunavik. In that respect, 25% of the study’s participants experienced a change in their economic situation in the year preceding the survey. Reversals of fortune due to death, divorce, or loss of income can plunge a household into hardship. Furthermore, considering the general low standard of living of Nunavik residents, it is quite possible that numerous heads of households had lived through periods of food insecurity at one time or another, which may explain why even high-income households adopt coping strategies. As a result, the continuing and widespread risk of material insecurity would be a factor that would strengthen the ties of community assistance. In fact, as evidenced by the high proportion of households living under the poverty threshold in Nunavik, a rather small proportion of the community would be free of material insecurity.

Obligation to provide assistance and personal beliefs are factors that contribute to the maintenance of a sharing network. For example, there is a common belief among Inuit that animals give themselves to the hunter. Bodenhorn (2000) argued that for Iñupiat, sharing brings the animals back to the hunter, whereas in Northeastern Greenland, Nuttall (1992) found that the hunter must in turn give the animal back to other people.

All of the above factors contribute, to varying degrees, to contain the influence of income on the development of an independent attitude.

**Income and Deprivation**

The analysis reveals a relationship between lower income and food rationing, for which we suggest two interpretations. First, as a food insecurity indicator, rationing may be an advanced step in the escalating process of a food insecurity continuum (Maxwell *et al.* 1999; Tarasuk 2001). Consequently, rationing in its most immediate form refers to a high degree of material vulnerability.
Why are people forced to deprive themselves? How can this sort of behaviour be explained in a community that holds a centuries-old tradition of mutual assistance? First, the duty to provide assistance is not felt as much today. In this respect, many elders complain that young people no longer feel a sense of duty to provide for elders. For example, a lack of respect for elders by young people was the greatest problem mentioned in the 1992 Québec Health Survey in Nunavik (Lamothe and Lemire 1994). In addition to the slackening of social rules, more selective distribution of country food is noticed in all regions of the Arctic (e.g., Condon et al. 1995; Collings et al. 1998). Discriminatory distribution, a phenomenon that results from living conditions in larger and increasingly heterogeneous communities, such as Kuujjuaq, could reduce access to functional social networks for some individuals.

Another difficulty for individuals in need lies in the fact that the food and goods circulation network implies reciprocity. According to Bodenhorn (2000) in the case of Iñupiat, sharing implies balanced exchanges of goods and services, including incommensurables, where the balance can only be maintained through on-going interactions.

In Barrow, the most extensive sharing occurs between households of close kin – certainly people who are ‘gross status equals’. ‘We share with everybody’ does not mean ‘we share everything.’ On a day-to-day basis, household needs are met first. Only some things (communally shared animals) and some contexts (i.e., communal feasts) are constructed so that literally everyone in the community is entitled to receive food. In addition, some people (‘the old people’, ‘the ones in need’) are given food without expectation of return. (Bodenhorn 2000: 45-46)

Maintaining the balance in exchanges is important, as one respondent collecting social assistance explained: “I receive money once a week from my family. … from my stepmother. I also give money to my stepfamily. In fact, they help me and when I have money I buy something even if they have not asked for it” (Interview no. 18). Although individuals can turn to the community for help, the fact that periodically or repeatedly asking for help may lead to a feeling of economic insecurity cannot be discounted. Tensions in relationships can develop when there is a lack of balanced reciprocity, despite the presence of firmly entrenched social obligations and the ideology of egalitarianism often expressed by “we share with everybody” and its counterpart “we receive food from anybody.”

Second, rationing may indicate that an individual sacrifices food in order to afford other items deemed more significant or for which the need is felt more intensely. In some cases, rationing can reveal acute problems such as gambling, alcoholism, and such other addictions as reported by Vanier and Grey (1998) as a prime cause of poverty in Kuujjuaq. Rationing can also indicate a person’s desire for a specific material possession. For some, maintaining and operating production equipment can be a higher goal than having enough food in a short run. This can be especially true for lower-income hunters who can procure food to feed the family and at the same time can maintain or even enhance their role in the sharing networks. The result would therefore indicate the existence of variations in the scale or hierarchy of needs.
Income and Other Strategies
It is interesting to note that there is an absence of a correlation between reducing food expenditures and household standard of living. This suggests that some people may simply have a propensity toward this action; that it does not necessarily depend on income. This contradicts the popular opinion often expressed about Inuit that they do not budget (e.g., Vanier and Grey 1998). It has, however, been demonstrated elsewhere (Chabot 2003) that Inuit are rational and practical with regard to money and know how to manage their resources based on needs or priorities. Whether those needs or priorities are essential or not is subjective.

Regarding the relationship between the community freezer and lower household standard of living: the correlation suggests that although the community freezer has been established for the use of the whole community, without any controlling mechanisms, and that wealthier participants have accessed the freezer for food from time to time, there is a perception that the objective is to support those with greater needs. If this interpretation is correct, it would indicate a shift in the original intent of the establishment of the community freezer, as seen by the negotiators of the Hunters Support Program.

It is important to note that a number of factors were not considered in this study that can potentially influence the ability of an individual or household to cope with material problems. The problems could be related to other conditions such as the stability of income, the composition of the household, the age of children, or the ability to find help, or a belief in certain social principles or values. For example, household size and children’s ages can be either favourable or unfavourable to the household's ability to cope with difficult times. Thus, family providers whose children prefer store-bought food may have a much more difficult time meeting their preferences and needs. This type of situation might give rise to feelings of powerlessness and frustration in providing for the family; levels of insecurity could consequently be high. On the other hand, living with adult children who are willing to pool their resources can be considered as an asset (Chabot 2003).

Household Grocery Expenditures
The substantial difference between the cost of groceries per person is itself an important indicator. Analyses show that those who are food secure, based on selected strategies, spend much more on groceries, on average. This suggests two distinct situations. First, participants who spend less on groceries fulfill their food needs with country food. Second, the food preferences of wealthier individuals have evolved from the need for staples to a want of all kinds of food, which has a direct effect on expenditures. In Nunavik, food expenditures seem to have benefited from the continuous increase in income; from an average in Salluit of $13 per month in 1959 to $1,300 in 1995 (Chabot 2001)11.

11 These amounts of money are in actual dollars spent by households based on interviews. In 1959, imported foodstuff represented 26% of all monthly monetary expenditures (i.e., $52/month) while in 1995, groceries constituted 44% of expenditures (i.e., $3,107/month). These numbers also reflect the level at which the economy has been monetarized.
CONCLUSION

In the past, Inuit survived by using complex coping strategies as a reaction to cycles of food abundance and scarcity (Saladin d’Anglure 1967). In this respect, food insecurity was a fundamental dimension of traditional Inuit life. Today, many Inuit still try to find ways to cope with uncertainty about food or access to supplies, even though they are no longer forced to undertake lengthy migrations because of lack of resources.

This study demonstrates that income is a determining factor of food insecurity/security. This also corroborates the results of other studies that have shown the influence of low income on the high level of food insecurity among Aboriginal people (Che and Chen 2001; Rainville and Brink 2001). Inuit household economy is highly commodity-based, which explains why purchasing power is a key factor for food security in Nunavik, despite the preponderance of non-market exchanges and significant household production. As argued by Tremblay and Fortin (1964), the most influential factor of consumption is income. When income increases, all privations diminish.

Income influences economic behaviour, which necessarily has implications for social interactions. Analyses show that low-income individuals tend to rely more on social networks when they experience economic hardship, demonstrating that sharing-networks remain effective. Although the efficacy of relying on a sharing network as a strategy to cope with food insecurity has not been assessed, it is believed to be limited, as suggested by the higher propensity of low-income respondents to rely on a rationing strategy. This conclusion is also supported by findings of Dewailly et al. (2001) on the associations between employment (as an income indicator) and variations in individual food intake. Could sharing networks represent a safety net against absolute food insecurity (i.e., not eating at all) in Nunavik? Further research would be necessary to verify such a hypothesis. Conclusions on the limits and capacity of sharing-networks to adequately fulfill individual and family food needs open even greater research perspectives in the field of social exclusion. Is social exclusion part of the experience of food insecurity in Nunavik, knowing that poverty and social exclusion are seen as going hand in hand in the industrialized developed world (Tarasuk 2001)? Some of the data gathered during the survey tend to support this theory12. Answering this very question could unearth some unexplored facets of Inuit society.

In Nunavik, material conditions have transformed with continuous monetary income increases and with the concomitant expansion of individuals’ needs. This

12 Despite that a majority of Inuit households in Kuujjuaq live below the poverty threshold (68% according to Chabot 2004b), large gaps exist between households, even among the poorest. For instance, we collected several comments from people whose sharing network was limited to one person who became ill and died, and felt deliberately excluded from other informal networks. Although any explanation could only be tentative or weak at this point, we noticed that these participants were generally living in a state of severe poverty, were not wage earners and were dealing with various personal issues.
trend is especially well illustrated by the change in Inuit diet, and growth in food expenditure, including purchases related to food production which provides evidence of a major shift in the way people secure their livelihood today, where household food production and distribution only fulfill a portion of food needs. (Chabot 2001)

The transformation of material conditions also modifies the way people interpret food security/insecurity. The notion of food security appears relative and subjective, and has changed over time, according to perceptions that render particular situations unsuitable while they were previously considered normal or acceptable. For example, one elder stated: “As long as I am not hungry” (Interview no. 13). Considering the general upsurge in the standard of living of Inuit, it is reasonable to suggest that a marginal number of people would make a similar statement; younger generations are more broadly exposed to and influenced by advertising and consumer values. A study of privation might reveal a contemporary hierarchy of needs for Inuit who are firmly engaged in the age of the consumer.

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GREENLAND
Chapter Six

Food Security and Sustainable Development in Greenland: A Synthesis

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Perspectives on Food in Greenland

Tradition versus Modernization?

Food and food production have undergone marked changes in Greenland during the last century. In the past, consumption patterns followed sometimes significant natural changes that impacted the resource base. At other times, consumption has been profoundly influenced by modernization and industrialization of the food supply, by the cultural wake and its emphasis on traditions, including traditional deeds such as food consumption issues. The resulting situation today regarding what foods are available and what foods are eaten is a very complex structure, characterized by a diversity of food items --from local products prepared according to tradition, sometimes influenced by innovation, to foodstuffs produced outside the northern regions and prepared according to both European and North American cuisine.

Historically, northern indigenous populations relied on the variety of arctic flora and fauna for survival. Such was the case with the Greenlandic Inuit, whose diet, before the turn of the century was almost exclusively determined by the harvest afforded by a traditional lifestyle of hunting and fishing, except in periods of famine, when access to imported food contributed to survival. Today, country foods are still central to Inuit in the circumpolar North; they are essential to the nutritional, sociocultural and economic health of individuals and communities (e.g., Van Oostdam et al. 1999; Receveur and Kuhnlein 1996; Santé Québec 1995; Condon et al. 1995). Country foods and related activities (hunting, fishing, collecting, distribution, preparation, consumption), play critical roles in everyday life in many northern regions for reasons that include social and cultural importance, formal and informal economic value, and contributions to physical and mental well-being. However, despite the vital importance they play, changes in the harvest, use, consumption and attitudes toward these foods has occurred over the past two decades.

In many parts of the Arctic, consumption patterns show an increase in the use of some lower quality imported foods and a decrease in consumption of some locally produced foods. But in Greenland, quite another situation has prevailed for the last decades. The development of Greenlandic society, especially following WW II, has been marked by rapid growth in the population and increase in trade activities. The traditional diet, however, remains an important aspect of the lives of Inuit in
Greenland. Despite the fact that, as in other regions, the contribution of country food to the total diet has decreased, with a corresponding increase in market food consumption, traditional foods are still vitally important to health and are central to what is considered a typical Greenlandic diet (Thorling and Hansen 1997). Consumption of traditional components of the diet had been in decline until the late 1980s, when a renewed focus on country foods was taking place. In this connection, local informal markets and subsistence practices, in existence for a very long time, have been instrumental in a situation where the local agenda has been maintained and, even to a certain degree, commercialized (Rasmussen 2002; Marquard and Caulfield 1996). This has taken place at the same time as links to the world market, both in terms of a marked increase in the import of prepared food and a similar increase in the export of fish and fish products, have contributed to the creation of a balance in food production and consumption patterns (Morin, 2001; Rasmussen 2002). Consequently, food consumption patterns in Greenland have not been exposed to the same conditions that have developed in other parts of the Arctic, where increases in wage labour have led to a decrease in participation in traditional activities and the establishment of a market economy based almost solely on imported products.

Although country foods provide many benefits, they are also the major source of exposure to contaminants for Arctic peoples. Pollutants enter the marine environment from local sources and from sources outside Greenland, transported via the atmosphere and ocean currents (AMAP 1998, 2002; Christensen et al. 2003). As marine mammal populations are generally distributed over large areas that include the waters of several nations, fishing, hunting and other influences on one part of a stock or population will eventually affect the rest of it, both inside and outside of Greenland waters. Environmental conditions (e.g., cold temperatures, short food chains), coupled with biomagnification of chemicals in the marine food web, contribute to the accumulation of certain persistent contaminants in country food species. As a consequence, Greenlanders, like other Arctic populations, are much more exposed to contaminants through their diet than most populations in more temperate regions of the world (AMAP 1998, 2002, 2003; Deutch and Hansen 2003).

In this paper, we discuss the contemporary food system in Greenland, and in particular the factors that impact food security—the social system, supply mechanisms, and outputs. As an underlying theme, we explore the risks that can threaten food availability and accessibility and, consequently, sustainable development in Greenland.

Development of the Fisheries
The transformation from a society characterized by hunting activities and semi-nomadic land and sea occupancy to one dominated by fisheries and sedentary lifestyles in settlements began around 1900. Commercial fisheries developed slowly, from first attempts in the late 19th century through increased activities during the 1920s, supported by an intensification of research activities. Fisheries became the dominant activity, and led to the establishment of the present day settlement structure, as fish processing operations became a key factor in the concentration of people close to the harvesting sites for the main resource—cod (Rasmussen 1998a, 1998b). The major drivers in the development of the fisheries were the decreased profitability of the seal industry, and the growing problem of feeding a semi-
sedentary population on a dwindling seal resource caused by a marked increase in sea temperature. During the 20th century fisheries became the dominant economic base; in the 1950s, the cod-fisheries boomed, which sparked the development of processing industries marked by a move toward modernization of the economy, society, and culture—with positive as well as negative consequences.

Figure 1. Municipal centres in Greenland
Although the cod fisheries boomed, socioeconomic conditions were underdeveloped until 1945 (Kleivan 1970). At the same time, many traditional institutions such as the meat-sharing systems and other mechanisms for mutual aid had largely broken down in the centralized communities, and eroding in many of the outlying settlements (Kleivan 1970). This lead in 1950 to the G-50 plan to modernize the economy by means of an increased focus on commercial fisheries, and aimed at moving Greenland out of this underdeveloped state. However, a failure to attract private sector investment to kick-start business activities led to the development of a G-60 plan emphasizing public sector involvement in development, leading eventually to the establishment of many of the present day structures in the institutional framework of Greenland. From 1947 to 1960 the level of cash income among Greenlanders increased by 2.5 times in real value (Klevian 1970), measured on a formal economy based on the harvest of renewable resources.

Since 1980 the economy of Greenland has been based largely on large-scale cold water shrimp fishery, including large factory trawlers, and with access to various international markets. Shrimp stocks around Greenland were known since the start of the century, but it was only during the 1960s that the commercial fisheries developed and soon became a cornerstone harvest, especially after the cod stock was decimated as a result of changes in sea temperature during the 1980s (Rasmussen and Hamilton 2001). Despite these remarkable and profound changes, Greenland prevails as a country with a dual economy. Hunting activities and small-scale fishing for subsistence and informal economic activities continue all over the country, and run parallel to the highly efficient commercial fisheries, the large-scale fish processing, and other industrial activities, and the dominant service sector. There are, however, marked regional differences: large-scale industries dominate the Open Water District in West Greenland; hunting and small-scale fisheries are most typical economic activities of the population in East, South and North Greenland; and small-scale fisheries, supplemented with hunting prevail around the smaller settlements along the west coast.

Food Production and Consumption

Food production in Greenland is characterized by a diversity of food items, from local products prepared according to tradition, sometimes influenced by innovation, to food produced outside the northern regions and prepared according to European and/or North American styles. Local informal markets and subsistence practices, however, continue to play an important role in the food supply system, so that the consumption of Inuit country foods is found to be high. Results of the 1993-94 Health Survey conducted among 1580 adult Inuit show that on average, 29.3 meals featuring country foods were consumed each month (Pars et al. 2001). The contribution of country foods to the total daily average energy intake was estimated to be 22% (Bjerregaard 2000). Greenlandic men consumed more country foods than women and the consumption of country foods increased with age with the exception of terrestrial mammal consumption which was similar among the elders and younger Inuit (Pars et al. 2001). The difference between generations was most pronounced in the towns, where older Inuit consumed country foods almost twice as often as the youngest age groups. A higher consumption rate was observed in villages or northern communities than in larger towns or in the southern part of the country. Regional differences were most pronounced for seal, and the consumption of birds and whale
meat was twice as high in the northwestern country villages than in other regions. The most preferred country foods for Greenlandic Inuit were mattak, Brunnich's guillemot, dried cod, crowberries and seal meat (Pars et al. 2001). The survey indicated that seal meat and fish were the most commonly consumed, with a daily rate of 100g of seal (meat and blubber), 64g of fish, 44g of whale and 17g of seabirds. Potatoes, fruit juice, fruit syrup, cheese, vegetables and butter were the most popular market foods consumed on a daily basis. The young consumed fruit and vegetables, fruit syrup and soft drinks more often than older Inuit, while there was no age difference for the consumption of dairy products. The consumption of market foods, in general, was higher in towns than in villages.

**ENVIRONMENTAL INFLUENCES, FISHERIES, AND FOOD SECURITY**

**Pollution in the Arctic Ecosystem**
In the past, the Arctic had been viewed as a region free from much of the environmental damage caused by industrial activity witnessed at lower latitudes. However, the presence of chlorinated organic compounds and trace metals in arctic food chains testifies to the fact that certain pollutants are transported over long distances to the Arctic. Pollutants enter the marine environment from local sources and from sources outside Greenland via atmospheric and oceanic currents. The sources and pathways for some contaminants is not fully understood, but in general pollutants originating from sources outside Greenland dominate the anthropogenic contribution to organic contaminant levels. An understanding of the origins and bioaccumulation of contaminants is important because of the specificity of the Greenlandic ecosystem, and the Inuit population’s relationship to it, which makes it explicit that human exposure to contaminants can be of great concern.

**Resource Fluctuations and Commercial Activities**
Central to the issue of food security is the availability of a regular supply of nutritionally, socially, culturally and economically important country food species. Of particular interest, then are those factors that influence the abundance of, and the ability of individuals and communities to access, these resources. The marine ecosystems of the southwest and southeast waters are, in terms of commercial fishery resources, the most productive and most thoroughly investigated in Greenland. They are intermediate ecosystems—between the cold polar water masses of the Arctic region and the temperate water masses of the Atlantic Ocean—and are characterized by relatively few dominant fish species (Rätz 1999; Pedersen and Zeller 2001). Ocean currents that transport water from polar and temperate regions affect productivity in the Greenland shelf areas; changes in the North Atlantic circulation system therefore have major impacts on the distribution of species and fisheries yield in these regions (Pedersen and Rice 2002; Buch et al. 2003). Fisheries along the west coast of Greenland are dominated by three major water masses: cold (−1.8 °C) polar water circulating through the Nares Strait, Baffin Bay and Davis Strait; the comparatively warm (3–4 °C) Irminger Current, a branch of the North Atlantic Current, which transports warm water from the Gulf of Mexico to Europe (Smidt 1989:13); and, fresh water melting from Greenland's ice sheet (Nielsen et al. 1970). West coast water temperatures reach levels around 3–4 °C in July and as high as 6–8 °C in August along the more southern banks. At Store Hellefiske Banke (west and
north of Sisimiut) the temperature can reach as high as 4–6 °C in late summer. But variations in summer temperatures are substantial, affecting cod and other marine species. Variability in temperature has been recorded for the last 150 years. In the mid 1850s, a short period of relatively warm water was observed, with concomitant good fishing. Another warm period occurred during the 1880s. By 1926 a new warm era was underway, continuing to the late 1960s with average temperatures at substantially higher levels (Nielsen et al. 1970). Such marked changes in temperature influenced fish stocks in a number of ways.

![Figure 2](image-url). Total international and Greenland fisheries in Greenland waters. Source: Rasmussen and Hamilton 2001 and Statistics Greenland 1998-2002.

Fisheries records show that cod appeared for a short time around 1820 and again in the late 1840s. This coincided with brief rises in temperature, but the greatest increase in cod fisheries appeared in connection with a marked temperature increase around 1920 (Smidt 1989). The first commercial fishery was established in Ilulissat in the 1890s as a private activity (Nørrevang et al. 1971), but was soon taken over by KGH (the Greenlandic Trading Company). Congruent to this was an initiative in 1904 aimed at enabling the sale in other parts of Greenland of Greenland halibut (*Reinhardtius hippoglossoides*) in Ilulissat, and Arctic char (*Salvelinus alpinus*) (Smidt 1989). In the ensuing years, more salting plants were being established along the coast, in conjunction with a small-scale inshore cod fishery in the 1920s, mainly producing salted products. As seal hunting was declining, cod fishing replaced it as a commercial activity, giving the hunters access to cash, and thereby also to the items sold by KGH. Besides sugar and coffee, it was guns and equipment for fisheries that were being purchased. Whereas seals had traditionally provided Greenlanders with almost everything they needed to survive (not only as food but also as material for clothing, cooking and heating), the cod fisheries
provided only food, and therefore created an obvious demand for involvement in commercial activities (Smidt 1989). The expanding resource attracted foreign interests—from Norway in 1924, the Faroes in 1925, followed by Britain and Portugal. Besides cod, a large number of Greenland halibut were being caught. Figures 2 and 3 illustrate trends in total catches in Greenlandic waters, and more specifically total catches by Greenlandic fisheries from 1911 to 1997, for all species, by category (with cod being the largest). The graphs reveal resource exploitation in relation to dynamics—with an initial building in the 1920s, a huge spike of foreign trawler activity in the 1950s and 1960s, followed by a steep decline and a final collapse in the early 1990s.

![Graph showing total catches in Greenlandic waters from 1911 to 1997, for all species, by category (with cod being the largest).](image-url)

**Figure 3.** Greenland fisheries in Greenland waters. Source: Rasmussen and Hamilton 2001 and Statistics Greenland 1998-2002.

During the 1950s the longline and dinghy fisheries were still predominant, but the trawlers' take was increasing. As the cod fishery began to fail, however, shrimp took over as the main harvest. Salted and dried goods were the main products as the commercial fisheries grew through the 1920s and 1930s. Even after the introduction of freezing plants, salted products continued to be important because, among other reasons, they could obtain rather high prices. But with industrialization, especially the second phase beginning in the early 1960s, frozen seafood—particularly frozen cod fillets—became the chief export. When cod stocks declined, other products rose in importance. Shrimp have been a major export for the last 25 years. At first, peeled shrimp were the main commodity; however, during the 1970s, it became apparent that the large whole (shell-on) shrimp could be marketed at substantially higher prices. Today a majority of the shrimp catch is exported whole, processed only by packing and freezing.
Figure 4 shows the value of fish products exported from Greenland, in millions of Danish kroner. Shrimp products, and particularly the whole shrimp, clearly dominate these exports. Other products also enter the export sector, including Greenland halibut and the highly-valued snow crab (Rasmussen and Hamilton 2001).

Populations of Arctic species vary and change naturally, some over years and others following decadal patterns related to and influenced by the availability of prey species, habitat, intra- and inter-species competition, and other environmental factors. Additionally, human activities such as harvesting patterns or disturbance through development or other forms of interaction may influence the number and distribution of animals. Animal population assessments and trends are important to consider in the context of northern food security as they can be indicative of the existence (or not) of a food source upon which many human populations might rely or use to varying degrees at certain times of the year.

Analyses of age structure in cod catches have been used for a detailed model of stock determination for the last 70 years. Reproduction patterns in the Greenland stock are described in terms of a temperature-reproduction model. The salmon stock also seems to vary with temperature. After many years of high production, the catch declined in 1983 and 1984, following two extremely cold winters in 1982–83 and 1983–84, respectively (Smidt 1989). A general characteristic of the population structure of this longer-lived species shows many large, old individuals when the fishery began. But because of slow reproduction and growth rates in cold and/or deep water, the population's age structure shifts downward as fishing intensifies. Consequently, fisheries tend to shift from a take of a limited number of large, high-value animals toward a harvest characterized by an increasing number of younger animals of less value. This trend has been observed not only with cod, but also with halibut, wolfish and other species (most recently including shrimp) (Rasmussen and Hamilton 2001).
Chapter 6: Food Security and Sustainable Development in Greenland

RISKS AND BENEFITS OF COUNTRY FOODS IN GREENLAND

Access to and availability of country food has been a pressing concern in many parts of the Arctic. In general, the increase in imported foods has not completely replaced the importance and use of local products; subsistence activities have been maintained, providing for a continuous supply of country food for a major part of the population. However, there have been marked differences in the way local products are supplied to individual consumers throughout the Arctic. Divergent strategies, along with the relative availability (or lack thereof) of local products, have had serious impacts on the food supply and consumption patterns that exist today.

Consumption Patterns

In Greenland, there are five main sources of access to country food: individual subsistence production, involving the majority of the population at some level; sharing of products between relatives and neighbors; more formal sharing arrangements such as community freezers etc.; and informal markets in the local marketplace—the Kalaalimerniarfik—a crucial institution. There are also formal markets (supermarkets and local shops) through which country foods are accessible centrally. Marquardt and Caulfield (1996), in their analysis of local market development in Greenland, clearly demonstrate that not only do subsistence activities in Greenland co-exist with the formal economy, but the discourse in Greenland cites subsistence and informal marketing as important development factors. Their analyses show how the local markets—the Kalaalimerniarfik—materialized in the 18th century to meet the needs of the colonial system, and how they have been used as a kind of ‘equalizer,’ to provide even access to imported goods for Greenlandic hunters and those working for the colonial authorities.

The market has worked as a redistribution channel through which hunters are able to get the necessary funds to buy European goods, while Greenlandic and Danish salaried employees have had access to valued country foods, locally produced items of clothing, and other goods. Without the local market, a more manifest divide might have developed between subsistence and commercial activities. Instead, the informal sector has served to link the formal and the subsistence sectors of the economy, creating a certain complexity in the system (Rasmussen 2002).

As a general rule, Greenlandic populations are most exposed to contaminants in their diet than those in Europe and North America, with the possible exception of those in the Canadian Arctic. The reason is that food items from the marine environment (fish, seabirds, seals, and whales) are much more frequently consumed in Greenland, and at the same time some of these food items have some of the highest levels of contaminants, i.e., metals like mercury and cadmium and organochlorines like PCBs. Among Arctic populations, Greenlanders have the highest concentrations of mercury and PCBs (Hansen 1998). An increased awareness of risks related to the consumption of local food due to global contamination has led to comprehensive assessments of contaminants in the Greenland marine environment and their effects on sea birds, ringed seals, polar bears and human health (Riget et al. 2003; Deutch and Hansen 2003; AMAP 2002, 2003). These assessments have added substantially to the general knowledge about environmental risks connected to food...
consumption patterns, resulting in a reasonably comprehensive understanding of the present situation.

**Sources of Contaminants**

The main sources of marine pollution are industrialized areas in Europe, Russia, USA and South East Asia (AMAP 1998, 2002; Christensen *et al.* 2003). Pollutants are transported to Greenland by the atmosphere and by marine currents; however, transportation by ice may also play a role, minimal at best—air is predominant source (AMAP 2003). It is generally agreed that pollution—and almost exclusively chemical pollution—has a moderate to severe impact on food security and therefore is considered to be an issue of major concern for Greenland at present.

Pollution caused by solid wastes was once considered a minor problem in towns and settlements. It is still a problem in most villages, but in several of the towns combustion plans have been devised to reduce the solid waste problem, instead using it to produce heat to warm homes. This has contributed to solving one problem, but there have been reports of management problems causing fumes and potential dioxin contamination, the most important being problems maintaining a suitable combustion environment with sufficiently high temperatures (Rasmussen 2002). Similarly, ongoing and abandoned military installations and base activities add to the potential pollution level. Abandoned materials, extensive use of paints containing PCBs, and large numbers of drums containing oil residue and undetermined substances all add to the health hazards associated with cleaning activities, and contamination of the surrounding environment (Rasmussen on [www.geo.ruc.dk/nors/asp.htm](http://www.geo.ruc.dk/nors/asp.htm)).

In marine fish, the highest OC levels were found in bottom feeding species such as Greenland halibut. In seabirds, the highest OC levels were found in opportunistic feeders such as glaucous gull and in species wintering off North America and Europe, such as kittiwake. The highest OC levels in marine mammals were found in narwhal, beluga, and polar bear. Considerable evidence now exists of higher OC levels in marine biota from east Greenland than from west Greenland. OC levels in landlocked Arctic char were in the same range as that found in marine fish species. No consistent geographical pattern of OC concentration was observed, although higher levels of OCs are reported for marine mammals from East Greenland, as compared to northwest Greenland and no significant difference is reported between levels analyzed in the late 1970s and late 1980s (Muir *et al.* 2000a, 2000b). Concentrations of DDT, HCH and CHL were lower in a southwest Greenland Arctic char population in 1999 than in 1994. No significant changes were found of PCB-10 and HCH concentrations between 1994 and 1999. OC concentrations in biota from Qeqertarsuaq showed no consistent changes from 1994 to 1999-2000. In shorthorn sculpin from Ittoqqortoormiit PCB and HCH were significantly lower in 1999-2000 than in 1994. This was also the case regarding HCH in male ringed seals. In polar bears from Ittoqqortoormiit in 1999-2000, PCB and CHL levels were considerably lower than in 1990. In general, OC levels in biota from West Greenland were comparable with OC levels found in similar species from eastern Arctic Canada, whereas biota from East Greenland were between the levels in west Greenland and Svalbard or at the same level as found in Svalbard. Circumpolar patterns of PCB, DDT, and CHL in ringed seal, minke whales and polar
bears generally increase eastward from the eastern Canadian Arctic, West to East Greenland and Svalbard, whereas the opposite trend was found for HCH.

Based on interviews of aboriginal polar bear hunters in East Greenland, 13 macroscopic pathological changes in 1,110 bears were reported. However, it is yet unknown whether these abnormalities are related to contaminant levels. So far, a single pseudohermaphrodite (female) out of 94 (35 identified females) examined polar bears have been observed in east Greenland. Preliminary results show that female polar bears are lower in bone mineral density than males, but it cannot be determined whether post menopansa bears and recently sampled bears suffer from contaminant-induced osteopenia. Polar bears show a significant increase in the frequency of parodontitus with age, but no temporal trends have been detected to date. New data on contaminant concentrations in animals used for food, combined with improved dietary surveys, have made exposure estimates possible and the identification of species and organs contributing most highly to human exposure. On a country-wide basis, seal blubber followed by whale blubber are the predominant sources of POPs, whereas seal meat is the main source of methyl mercury. In areas where polar bear is consumed, it can be a major additional source of POPs.

Northern country foods, however, are also important sources of several key nutrients such as protein, vitamin A (in particular marine mammal liver and fat), vitamin D, iron, zinc, phosphorus, selenium and omega-3 fatty acids, which are essential for optimal nutritional status of Inuit and other Aboriginal groups. Country foods can also provide protection against many diseases, which are more prevalent among southern populations. In general terms, it can be concluded that the consumption of country food is beneficial for the health of the population.

Protection Afforded by Omega-3 (n-3) Fatty Acids and Selenium
Numerous studies have reported that the Inuit traditional diet, which is rich in fish and marine mammals could protect individuals against cardiovascular diseases (CVD) (Dewailly et al. 2001; Bjerregaard et al. 1997; Dyerberg et al. 1975; Dyerberg et al. 1978; Boudreau et al. 1993; Newman et al. 1993; Middaugh 1990). This beneficial effect is attributed to the n-3 fatty acids obtained from aquatic country foods. Plasma concentrations of n-3 fatty acids are high among Inuit populations and reflect their elevated intake of fish and marine mammals (Dewailly et al. 2001; Newman et al. 1996; Parkinson et al. 1994; Hansen et al. 1994). The high dietary intake of these fatty acids may also afford beneficial effects on cancer, diabetes, hyperinsulinemia and birth outcomes (Young et al. 1999; Dewailly et al. 1998; Friedberg et al. 1998; Storlien et al. 1997; Adler et al. 1994; Kromhout 1990). Selenium is another key nutrient of the traditional Inuit diet, and fish and marine mammals, especially mattak (beluga skin), are rich sources of this element (Blanchet et al. 2000; Egeland et al. 1998; Hansen et al. 1994). It is currently believed that selenium acts as an anti-oxidant in the prevention of artherosclerotic diseases (which are not prevalent among Inuit populations) and may reduce the risk of mercury toxicity in humans (Hansen et al. 1994; Salonen 1986; Kershaw et al. 1980).

Social and Cultural Benefits
For many northern groups, the concept of a healthy lifestyle is closely linked to the land and land-based activities such as hunting and fishing (Kuhnlein et al. 1996; Kuhnlein and Receveur 1996; Shea 1990). However, in numerous aboriginal
populations, a trend toward a more sedentary lifestyle as a result of urbanization and acculturation, appears to be partially contributing to an increasing prevalence of obesity, diabetes, and CVD. Fishing, hunting, and other country food harvesting activities (e.g. berry collecting) are opportunities for northern people to increase physical activity, contributing to the maintenance of normal weight, and preventing metabolic disorders in addition to providing opportunities to benefit from the social and cultural aspects associated with these land based traditions (Dewailly et al. 2000a, 2000b; Egeland et al. 1998).

Aboriginal people in all regions attribute significant social, cultural and spiritual benefits to country foods. They are reported to define, maintain, and increase aspects of the cultural and social identity and well-being among individuals and Inuit communities today (Dewailly et al. 2000a, 2000b; Pars et al. 2001; Egeland et al. 1998). Similarly, distinct benefits are attributed to the activities of collection, distribution, preparation and, consumption of country food species. The consumption of country food, and hunting and fishing activities, are central to Northern individual and collective identity, physical health and well-being. Even though they are usually ascribed more readily to traditional village life, while town inhabitants are considered to be living a more ‘globalized’ lifestyle, local products have become an important contemporary staple, as evidenced by consumer impacts on the market structure. The green consumer who is conscious about nutrition as well as ethical issues of animal welfare, and in the Arctic, cultural consumers conscious about the origin of products—are, through their choices, causing changes in demand which, in turn, greatly influences supply, and in the end are instrumental in the maintenance of a local production of products. Country foods, in addition to the nutritional qualities they bring, are also seen as an identity maker. Identity construction, as it related to the traditional Inuit diet may also apply to young people who have an almost equal level of preference for country food and imported food bought in the stores, much like they have to an openness to ‘living both lives’ which has been in many ways confirmed.

**RISKS AND BENEFITS OF MARKET FOODS**

**Consumption patterns**
A certain influence on food consumption patterns began when Europeans entered the region, and brought with them conspicuous consumption, arousing the fancy for alien items such as sugar and coffee. Trade activities introduced through colonial relationships, however, had more severe consequences as they often deprived local populations of certain products of their subsistence, replacing them with imported goods of less quality, and creating dependency relations. This situation was aggravated by sedentarization, which eventually limited the radius of action of a region’s population. With settlement of Inuit and other northern Aboriginal populations into permanent communities, there was a decrease in country food consumption as market foods became increasingly available.

The major transformation in consumption patterns, however, was caused by modernization of the 1950s and 1960s, where a much larger variety of alien food products were introduced. Especially, the introduction of supermarkets during the 1970s had serious consequences—to such a degree that a lot of traditional products began to disappear from the diet. From the turn of the century to the mid 1950s, the
import value of food remained rather stable at about 5-7 000 DKK per capita (fixed 1998 values), but with industrialization in the 50s and 60s, an increase in the consumption of imported food had set in by the late 1950s and reached a peak in the mid 1980s at about 20000 DKK per capita (Hamilton et al. 2003). Before the 1950s, imports consisted primarily of staples like cereals, as well as various meats and dairy products; sugar also had a certain importance. During the 1950s the diversity increased substantially. All food groups had witnessed an increase in importance, but beverages, meat and meat products were especially dominant. The import of fruit and vegetables also contributed substantially to the increase of imports, while most other groups have a more limited importance. Generally, though, the main items available in supermarkets were imported foods, and the abundance and relative variety of supply gradually replaced many country food items. It became more convenient, and certainly also fashionable, to serve imported products.

In the late 1980s, a drastic change took place, marked by a reduction of imports of several food groups. Beverages were the first of the imports to decline, due to the establishment of the Nuuk Imeq factory in 1988 and the bottling of beer and soft drinks. But there were also decreases in many other categories, and the general trend showed a marked reduction in a dependence on imported food, with the replacement of these items with local products, either bought through the informal market or other distribution channels, or, increasingly, through to the marketing of products from Greenland.

Risks and Benefits

The substitution of country foods with market foods is not always desirable, especially when the lower nutritional value of some market foods is considered (Santé Québec 1992). According to Morrison et al. (1995), the nutritional content of the Inuit diet has declined because less animal foods are consumed and vitamin and mineral intakes are not augmented by frequent consumption of healthy market foods.

The increasing intake of energy in the form of carbohydrates associated with a more sedentary lifestyle, the progressive abandoning of aspects of the traditional diet and the high rates of obesity have caused the emergence of type 2 diabetes among numerous native populations (Dewailly et al. 2001a; Greenlund et al. 1999; Schraer et al. 1997; Kuhnlein et al. 1996; Ellis 1994). Evidence of deficiencies of particular vitamins and/or minerals have not been documented among Greenlandic Inuit, but insufficient dietary intakes have been observed in other Inuit populations (Blanchet et al., 2000; Kuhnlein et al. 2000; Wein 1995; Santé Québec 1995; Lawn and Langner 1994). In particular, low intakes of vitamins A and C, calcium, folic acid and iron (especially in Nunavik) were observed among Inuit populations.

The availability of market foods may continue to increase in northern communities. The substitution of country foods with market foods, without nutritional education could lead to disabilities and chronic diseases among these populations. The consumption of healthy market foods, however, combined with nutrient-rich country foods could ensure optimal nutrient status, just as a reduced intake of refined carbohydrates in concert with regular physical activity may prevent obesity and type 2 diabetes. An important contribution to improving nutrition has been the inclusion of declarations on all imported food, which helps promote better eating habits, and enables the individual control of choice. Another approach would be the development of specific food policies, such as those used in Norway for
decades. Public awareness of the need to better understand what constitutes healthy food, is a growing culture in Greenland. This is especially true among more well-educated individuals, but it also applies more generally now with the inclusion of cooking skills and knowledge about nutrition as part of the school curriculum. The share of organically-grown products is increasing, and the quality control of both imported and locally produced products is a daily occurrence for many people. Parallel to this, however, is a growing trend toward consumption of more products such as ‘health medicine,’ however, this generally involves a very different group of individuals.

There has been a tradition during the last 150 years in Greenland of a ‘positive’ interaction between local production and a colonial introduction of new approaches to cooking. In 1955, the colonial government established the ‘Ernæringsrådet for Grønland’ (Nutritional Advisory Committee for Greenland) with an aim to examine the nutritional status of the population, and suggest ways in which it could be improved. One recommendation was for the development of a cookbook for Greenland, an initiative that was well received and for which work was completed in 1963 with the release of ‘nerissagssiornermilik ilitsersûtit Kalâdlît-nunänut túngatitat’ (Caia Hansen 1963 — Kogebog for Grønland [Cookbook for Greenland]. The cookbook was intended for the modernized Greenland, and it has been an important centerpiece for many kitchens in towns as well as in villages. The intent was to merge the two worlds—the renewable resources sector of Greenland and principles of modern cooking, emphasizing quality of food according to health standards recommended by physicians recommendations, while at the same time taking full advantage of high quality local products. The cookbook included both traditional recipes and European approaches to cooking. Since that time, a wealth of new cookbooks have appeared, each adding to the process of merging the best of several worlds, but always with a clear focus on the possible use of local renewable resources.

RESOURCES ACCESS AND FOOD SECURITY IN GREENLAND

Over-Exploitation

Historically, cod has been the most important commercial fish species in Greenland waters, with annual catches peaking at levels between 400,000 and 500,000 tonnes in the 1960s, but until the introduction of the 200 mile EEZ in the early 1970s, most of the catch was done by foreign vessels. During the late 1960s, annual catches were drastically reduced, a decrease that was first and foremost connected to the cod fisheries, but which affected other commercially important fish species such as redfish (*Sebastes marinus*), Atlantic halibut (*Hippoglossus hippoglossus*) and wolfish (*Anarhichas lupus*). As discussed earlier, the occurrence of cod in Greenland waters shows very large fluctuations in abundance as well as in geographical distribution (Buch *et al.* 1994; Horsted 2000), caused mainly by changes in sea temperature. In addition to fisheries, there has been a reasonably stable hunting activity; at present more than 140,000 seals, several hundred whales, and several hundred-thousand seabirds are harvested per year, on average.
Over-exploitation of Atlantic cod, Atlantic halibut, Greenland halibut, thick-billed murre, king eider, common eider, and belugas are being reported in the literature (ICES 2003; Frich 1997; Mosbech et al. 1998; Falk and Kampp 2001). At present cod is very sparse in both offshore and inshore areas of West Greenland, and the ICES Advisory Committee on Fisheries Management recommends no fishing until there is evidence of a substantial increase in recruitment and biomass. The advice also emphasizes that a recovery plan for both inshore and offshore components should be developed, if the resources are able to recover (ICES 2003). Several species of seabirds belonging to the west Greenland ecosystem have been severely reduced due to human activities, and in most cases, hunting has been quoted as the main impact factor, as it is for the common eider, for example. Computer simulations suggest that the west Greenland winter population can sustain a take of...
approximately 8%, but at least 57,000 common eiders are harvested annually, which is approximately 12% of the total winter population estimated for West Greenland (Merkel 2002). As a consequence it is expected that the west Greenland breeding population may decline by 3.2% per year.

Regional Variations
When considering resource access as an important basis for food security at a global level, it is important to keep in mind that there are marked regional differences, both in relation to resource availability and in consumption patterns, and shown on figure 5 a-f. The most dominant activity in West Greenland from the Disko Bay area and south to Nuuk is undoubtedly the shrimp fisheries, characterizing most of the large settlements along the coast. However, Royal Greenland processing plants are only located in four settlements—Narsaq, Sisimiut, Aasiaat and Ilulissat, while a private company maintains processing facilities in Nuuk. Despite the fluctuations in cod stocks and its reduced overall importance, several settlements along the West coast from the Disko Bay area and south are still characterized by this sector. Apart from the cod-dominated settlements, only a few are also characterized by other types of fish products. Sheep farming is concentrated in the southern part of Greenland due to the low- and sub-arctic conditions in the municipalities of Narsaq, Qaqortoq, and Nanortalik. After its introduction at the beginning of the 20th Century, farming was considered an activity characterized by a certain degree of uncertainty, and so hunting and fishing were essential activities that contributed to the livelihood of farmers. However, with re-structuring of trade in the early 1980s, farming became more a full time vocation, and today supplemental activities may contribute to subsistence of the farmers, but to which limited commercial value is attached. Hunting as a commercial activity has, overall, diminished in importance, especially as a result of opposition to the fur trade by various animal rights groups. It continues, however, to be a dominant commercial activity on the East coast and North Greenland, and for a few settlements in the Disko Bay area and South Greenland, mainly because subsidies paid by the Greenland Government. In addition, hunting on a subsistence level is still a significant activity in most settlements.

When discussing the resource base for food security, it is important to be aware of these regional differences—differences that are not only characterizing commercial activities in the communities, but that are influencing subsistence activities in general. In this regard, ‘hunting’ is a very broad category, and it is important to be aware that hunting patterns differ substantially between the regions.

Rationales and Strategies
Both in fisheries and in hunting, there are very distinct differences between large scale and small scale activities, with consequences for the structural and economic divisional patterns, as well as for political relations which are important for development, and eventually, for food security. Subsistence activities are also still maintained, bringing a continuous supply of country food to a major part of the population. In fisheries, there is the off-shore sector dominated by the general trends of capitalism, concentrated and centralized through large-scale projects and economy of scale as the fundamental mechanisms. Even Home Rule has not adapted capitalism as a direct formulated policy; it is, nevertheless, part of the formal
Chapter 6: Food Security and Sustainable Development in Greenland

ECONOMIC ACCESS AS A CONDITION FOR FOOD SECURITY

Exploitation of Renewable Resources
Based on conclusions from previous discussions, it can be argued that food security has never been seriously jeopardized in Greenland in the last century, neither due to climate changes nor to distant or local pollutants. There have been changes in consumption patterns, however, and often adaptations to changes in the resource base have been necessary. But there is nothing new in this, as living and surviving in the Arctic has always been a question of adaptation to environmental conditions—that is, adapt and survive, or perish. Similarly, consumption patterns have in many ways been shaped by socio-economic conditions, without, however, seriously challenging food security. There are many reasons for this.

First, the 150-year evolution toward a situation where the population in Greenland has become a crucial—and since the establishment of Home Rule a decisive—factor in the development process. The long process is important to take into account, when characterizing the situation in Greenland, and even the creation of Home Rule was an agreement within the Danish Realm that eventually handed over the decisive political and economic responsibilities from the Danish parliament to the Home Rule Government. Second, it is a process characterized by a slow transformation of social and institutional structures. Still, approximately twenty-five years after the inauguration of Home Rule, Greenland society has remnants of Danish colonialism.

As emphasized above, several factors support the statement that socio-economic conditions in general have not been jeopardizing food security so far. But this does not discount the need to know the conditions that are shaping the present and future of food supply. The discussion that follows will attempt to bring forward some of the factors shaping the conditions for food security.

It can be argued that the availability of country and imported food is aided by the diversification and importance of food sectors of the economy (primary production, manufacturing, commerce). In this respect, Greenland is in a marked different situation compared to many other arctic regions. Table 1 presents an overview of individuals involved in the generation and processing of renewable resources. The first part of the table shows the number of individuals engaged in the formal sector; i.e., persons involved in resource extraction in fishing, hunting, and farming, as well as in processing industries related to renewable resources. The table also shows the total value of the products generated by these activities. The last part
of the table indicates the number of individuals involved in informal and subsistence activities, and the monetary value of these activities. Given the nature of this information, it is encumbered by a certain degree of uncertainty. For example, it is important to note that there is overlap between groups, so that individuals involved in the formal sector may also be selling fish or hunting for the informal market, and at the same time, fishing for subsistence. Although Greenlandic society today is dominated by a market economy, great importance is attributed to country food acquisition, just as informal activities play an important role, both for subsistence and in acting as an equalizer, money generated from the formal sector is more widely distributed across population groups and between the larger and smaller settlements.

Table 1. Sectoral importance of renewable resources

<table>
<thead>
<tr>
<th>Type of activity</th>
<th>Number of individuals involved</th>
<th>Gross value Million Dkr</th>
</tr>
</thead>
<tbody>
<tr>
<td>a: Total acquiring and processing of renewable resources in the formal sector *</td>
<td>6.500</td>
<td>2.477</td>
</tr>
<tr>
<td>Fisheries *</td>
<td>3.450</td>
<td></td>
</tr>
<tr>
<td>Fish processing *</td>
<td>2.560</td>
<td></td>
</tr>
<tr>
<td>Hunting *</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Hunting processing *</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>Sheep and reindeer farming *</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>b: Total informal and subsistence sector **</td>
<td>15.150</td>
<td>690</td>
</tr>
<tr>
<td>Informal market activities **</td>
<td>650</td>
<td>432</td>
</tr>
<tr>
<td>Subsistence **</td>
<td>14.500</td>
<td>258</td>
</tr>
<tr>
<td>TOTAL (a+b)</td>
<td>21.650***</td>
<td>3.167</td>
</tr>
</tbody>
</table>

Sources:  
* “Mål og Strategier i den grønlandske erhvervsudvikling”, 1998  
** Rasmussen, 1998c  
*** This figure indicates the total number of individuals involved in all activities; since there is overlap between the groups, an individual may have been counted several times. For example, an individual who privately sells fish or hunting products to a factory, who also work as an employee on a fishing vessel, sells fish or hunting products on the informal market, and hunts or fishes for subsistence, will be counted four times.

Involvement in Formal Resource Extraction

A more precise and differentiated picture of involvement is illustrated in Figure 6 and in Table 2. In Greenland, the total value of sales of fish and hunting products to processing plants is approximately 500 million DKK. These sales are registered by the fishing industry and trade companies by means of a transaction document; each sale is considered to be one transaction, whether it consists of a few kilos of fish, or several tones of shrimp. The Tax Authorities track all formal income sources for individuals and families. It is therefore possible to obtain a picture of the relationship
between fishers’ and hunters activities in fishing, hunting, and wage earnings from other sectors.

Sales of products may occur at several venues, but the majority of formal sales activities take place at processing plants in major municipal centers. During summer, factory ships are also moored close to villages that have intense fishing activity, and sales (of primarily hunting products) take place in a few of the smaller settlements that do not have the capacity to process the harvest.

Table 2. Total number of hunters and fishers participating in the formal economy and fisheries (Source: Rasmussen, 1994)

<table>
<thead>
<tr>
<th></th>
<th>Number of Persons</th>
<th>Transactions</th>
<th>Sale value &lt; 30,000 Dkr.</th>
<th>Sale value &gt;30,000 Dkr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main income outside</td>
<td>3,339</td>
<td>&lt;20</td>
<td>2,327</td>
<td>31</td>
</tr>
<tr>
<td>fisheries and hunting</td>
<td></td>
<td>&gt;20</td>
<td>754</td>
<td>227</td>
</tr>
<tr>
<td>Main income from</td>
<td>1,467</td>
<td>&lt;20</td>
<td>580</td>
<td>48</td>
</tr>
<tr>
<td>fisheries and hunting</td>
<td></td>
<td>&gt;20</td>
<td>186</td>
<td>653</td>
</tr>
</tbody>
</table>
A more detailed picture is provided in Table 2, based on an analysis of the sales activities in 1990. In that year, a total of 4,806 persons were registered as being involved in the commercial sale of fishing and hunting products in one way or another. Of this group, approximately 2/3 derived their main income from activities other than hunting and fishing, while 1,467 received the larger part of their income from these activities. Of this group, 643 individuals reported an income of more than 30,000 DKK and had more than 20 sales transactions. They could be considered a group engaged full-time in fisheries and hunting. The others in this group posted a sale value below 30,000 DKK, or fewer than 20 sale transactions, and are considered part-time fishermen and hunters.

Food Industry

Manufacturing—There is a substantial processing sector in Greenland (the fishing industry, essentially) promoted by government policy requiring some onshore processing industries to create jobs in local communities. The fisheries processing sector represented 13% of total revenue (1991) and 9% of total employment (1996) (Danielsen et al. 1998: 23), resulting in massive exports of seafood products, to Japan and Europe in particular. The important export of food products from Greenland is comparable to that of the food entering the country, and provides considerable revenue to the region’s economic agents. Other manufacturing activities of local natural resources are also taking place; for example, the public-owned company Neqi slaughters about 25,000 animals annually (mostly sheep).

Distribution—Internal marketing of local and regional food products benefits from an efficient formal and informal sales system. From a formal standpoint, the sale of local products occurs through retail stores, organized into three major groups. The Brugsen cooperatives with 13 supermarkets in 7 towns—Nanortalik, Qaqortoq, Narsaq, Paamiut, Nuuk, Maniitsoq, and Sisimiut— with revenues totaling 383.4 million DKK, or 55 million US$. The KNI Pisifik, formerly public owned, now with 51% of the shares owned by Dagrofa A/S, is the largest supermarket chain in Denmark. The company has shops in Nuuk, Sisimiut, Ilulissat, Qaqortoq, Aasiaat and Maniitsoq, and total revenues of 738 million DKK, or 105 million US$. Finally, KNI Pilersuisoq, generates total revenues of 1.446 million DKK, or 207 million US$ with shops in all towns not served by KNI Pisifik, and in the villages, the latter a responsibility that brings the company public support. In addition to these three major players, there are a large number of small privately owned retail shops in the towns. In terms of food supply, Greenland stands apart from the rest of the circumpolar world by reason of an exceptional variety of supply of European products in these retail stores.

The Informal and Subsistence Food Supply
As regards informal transactions, ‘local markets’ (Kalaaliminniarfiit) are found in most communities as outdoor kiosks, where anyone can sell the products of hunting and fishing directly to consumers. These infrastructures are maintained by local governments, with which the association of hunters and fishers negotiates and sets prices (Marquardt and Caulfield 1996; Caulfield 1993). Roughly 10% of an individual’s harvest is sold in these markets, however, there are marked differences
that relate to settlement type and size (Rasmussen 1998a, 1998b). These informal economic activities are important in all settlement types, but most especially in mid-sized settlements, because many hunters and fishers from these settlements bring their products to markets in larger towns where the customer base is larger.

**Income Patterns**

Access to a food supply can be restricted by low average incomes. In this regard, geographical remoteness and level of urbanization are linked to disparities in income distribution. Figure 8 shows the general trend in income levels for a 10 year period, where total taxable income increased more than 40%, from 4.2 billion DKK in 1989 to 6 billion DKK in 1999. In addition to income, transfer payments add to total purchasing power of households. The greater part of transfers is applied to social services, which contributes to a leveling of income levels, whereby lower income groups are provided access to the formal and informal economy, including access to a more varied food supply. Despite many recent attacks on welfare policies in many countries, Greenland has maintained a rather stable level of social services, with transfers to households accounting for approximately 16% of total taxable income.

**Figure 7.** Trends in total taxable income, transfer payments to households, and transfers as a percent of total income (in million DKK). Source: Statistics Greenland 1990-2002.

**Regional income structure**—At the municipal level there are marked variations in income levels. Figure 9 shows a significant difference between Ivittuut and other municipalities. Ivittuut should be disregarded in the analysis because incomes in this municipality are almost solely generated from naval base activities in Grønnedal.
Between the remaining municipalities, the capital of Nuuk averages almost 100% higher income compared to average incomes among hunters in Qaanaq. The highest incomes are found in the large-scale fisheries and administration centres of Nuuk, Sisimiut, Ilulissat, Qaortoq and Narsaq. This pattern is also indicative for structures at the regional level. East and North Greenland are characterized by substantially lower incomes compared to average incomes in South Greenland and in the Disko Bay region, while the highest income level is found in mid Greenland, often referred to as the ‘Open Water District’ as the sea does not get ice cover during winter, and therefore is accessible year round. The substantially higher income level in this area results in potentially better access to formal as well as informal markets, and consequently to a more diversified system of food access.
Table 3. Types of income source in towns and villages (1988-1991)

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>URBAN CENTERS</th>
<th>MEDIUM AND SMALL SETTLEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>54,065</td>
<td>44,015</td>
<td>10,050</td>
</tr>
<tr>
<td>Taxpayers</td>
<td>45,706</td>
<td>37,210</td>
<td>8,496</td>
</tr>
<tr>
<td>Transfers per taxpayer</td>
<td>14,028</td>
<td>13,842</td>
<td>14,839</td>
</tr>
<tr>
<td>Total incomes per taxpayer</td>
<td>94,306</td>
<td>103,904</td>
<td>52,267</td>
</tr>
<tr>
<td>Portion of income as transfer payments (per taxpayer, %)</td>
<td>14.9</td>
<td>13.3</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: Rasmussen (1997: 74)—Data recalculated from income and transfer per capita to income and transfer per taxpayer

_Towns and Villages_—More variables come into play in exploring differences in incomes between towns and villages, as illustrated in Figure 11 and Table 3. Figure 11 indicates that taxpayers in towns have almost 40% more disposable income to spend on basic needs, including food and other consumables, as compared to inhabitants of villages. A general assumption has been that a higher level of transfer payments to the village would compensate for this discrepancy; however, the average transfer is almost identical for towns and villages, at about 14,000 DKK per person.

![Figure 9](image_url) _Figure 9. Average 1999 income (in DKK) for taxpayers in towns and villages. Source: Statistics Greenland._

Because of the higher total income levels for individuals living in towns, transfer payments only account for 13.3% of total income, while they account for 28% of total income in villages. Furthermore, the analysis shows that transfer payments in villages were given primarily as support for production, i.e., subsidies to fishing and hunting activities, while transfer payments provided to individuals in towns were primarily ‘unproductive,’ i.e., used for social
services, serving as an equalizer between high and low income groups. Consequently, the people in towns have more than twice as much disposable income than people in villages, providing access to a much wider variety of consumption options.

**Figure 10.** Average 1999 income for taxpayers born in Greenland and outside Greenland. Source: Statistics Greenland.

**Social structures**—The most marked differences in income is between those who were born outside Greenland and those who were born in Greenland. Figure 12 shows that the average income for a non-Greenlander is more than twice the average income of a Greenlander. The relatively small group of non-Greenlanders consists of mid-aged or younger persons, often single, well educated, invited to stay in Greenland for a number of years, and to be engaged in highly paid jobs. The Greenlanders are from a diversity of age groups, employed or unemployed, and in both low paying and high paying jobs. Similar variations in purchasing power are seen between age groups, as shown in Figure 13. The lowest income levels are found in young people from 15 to 20 years of age, many under-educated. However, in reality they are in a better economic situation than indicated due to access to various non-taxable social services such as rental payments, child support, study support etc. The elderly are those with the next lowest income level; they are primarily dependent on old age pensions. However, they too have access to various types of social support which increases their purchasing power. The group of persons with the highest available income is the middle-aged group, 25-55 years old and with an average income above 125,000 DKK.
Costs of Food

Three important elements of the food security need to be addressed: patterns of change in food prices compared to change in income patterns to assess the viability of food accessibility; differences in price setting for various types of food to determine to what extent price prevents or promotes access to quality food, and how price influences access in different types of settlements; and, finally the consequences of various regulatory measures, either limiting access by imposing import levies on specific items, or promoting access by means of different types of support.

Price development—Figure 14 illustrates pricing over the last 10 years for some major groups of food items, and includes changes in the prices that hunters and fishermen receive from sales of their products to the local processing plant. Furthermore, wage index fluctuations are included for the specific time period, as it gives a good indication of changes in access of different groups. As indicated, wages have increased at a higher pace than any of the other measures. At the other end of the scale, however, are fish and hunting products sold by
fishers and hunters to processing plants. This indicates that wage conditions for the majority of the population have been increasingly providing access to higher quality food for a smaller portion earnings, while for fishers and hunters the situation is reversed.

Figure 12. Measures of increases in food prices compared to wages. Sources: Food prices and wages from Statistics Greenland 1991-2002. Country food price development based on calculations from Statistics Greenland register of fisheries

Price policies—The dominance of state-owned and subsidized industry in Greenland is particularly noteworthy. Greenland has an unusual ‘single-price’ policy, offered by a few government enterprises, for certain critical goods and services (e.g., fuel, some foodstuffs, and transportation), based on ideals of social equity. One of these government enterprises has a monopoly over maritime shipping and offers identical rates for cargo, irrespective of the distances involved. The same applies to the supply of consumer goods to small communities, enjoying a similar situation for the transport of goods as provided by another State-owned business. The latter is active in about 53 small communities, and each year receives a budget from the government to help it maintain its prices regardless of the high selling costs. Frequently, communities that are disadvantaged due to geographical, weather, and demographic conditions, have a higher cost of living. This situation is counteracted by the ‘single-price’ policy, according to which the State owns specific businesses and entrusts a socio-democratic mission aimed at reducing inequities in the procurement of food supplies (Morin 2001).
The result of the one-price system is illustrated in Figure 16, showing the differences in price levels in villages and small towns compared to that of larger settlements. Price levels in large settlements serviced by KNI Pisifik are set to 100 for all types of products, and then price levels in smaller settlements, serviced by KNI Pilersuisoq, are calculated as indexed values of that standard. Despite subsidies, average prices are somewhat higher in villages, especially for more perishable products, while basics such as potatoes, sugar, bread, flour and cereals are indexed at the same level as the larger villages. Compared to the real cost of supplying the settlements, the price differences are remarkably low. But for villages, where the average income is markedly lower, the cost of food accounts for a higher proportion of income. This is counterbalanced, however, with a considerably higher contribution of local resources to the local food supply due to a higher level of subsistence activity in the villages.
Tax and import regulations—In addition to public measures aimed at providing a good and healthy food supply, there has also been a tradition of establishing measures to prevent or limit the adverse effects of conspicuous consumption, of, for example, alcohol, sugar, and smoking. These measures have not only been implemented to ensure a more healthy lifestyle, but also to make a positive contribution to the national economy.

Figure 17 shows the measure of total revenue from import duties since the establishment of Home Rule in 1979, using the main groups of contributions to this revenue. It is obvious that smoking and consumption of beer are contributing most to this source of revenue, with more than 60% of the total value. More recent introductions of import tax on food items such as meat products only contribute a minor part.

CONCLUSIONS AND OUTLOOK

In the 20th century, Greenland has experienced two important transitions, from an economy based on seal hunting to one based on the cod fishery; then, from the cod fishery to the shrimp fishery. These economic transitions are reflecting large-scale shifts in the underlying marine ecosystems, driven by interactions between climate and human resource use (Hamilton et al. 2000), and illustrate the resilience of the social system and an ability to adapt to change. The possible problems with customary consumption of animals with high fat content have, at times, been under scrutiny, especially due to the problems created by persistent pollutants from the South generated by the combustion of waste materials in
larger settlements. According to Mulvad (1997), although Greenlandic society
today is dominated by a market economy, great importance is still placed on the
production of country food. At the same time, however, Greenlanders are
concerned about the effects of contaminants in the food chain and possible
effects on their health.

Three positions have been identified among young Greenlanders
regarding food consumption. Those who eat Greenlandic food often tend to have
elder parents or live with their grandparents. Another group dislikes specific
items such as fish, but eat meat, or dislike seal but like caribou and muskox
(Kromann 2003). A third group do not like Greenlandic food and eat it only
rarely; they tend to have younger parents, and are a small group, living mainly in
the larger settlements. Whether or not they eat Greenlandic food is not a big
issue for young people in Greenland today, and it is normally not taken into
consideration when dealing with the question of identity.

Today, Greenlandic food is not solely prepared in traditional ways; it has
become an integral part of a modern globalized Greenlandic kitchen, processed
and cooked in many different ways. A large part of the population will serve
Greenlandic products at festive occasions, which is a change compared to what
was served at similar events 25 years ago. Among young people who are away
from home for education, the lack of access to Greenlandic food is often
discussed. The question is identifying ethnically as a Greenlander. It is a
question of lacking something good to eat, something that you enjoy and that
you are accustomed to eating, prepared in many different ways.

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Chapter 6: Food Security and Sustainable Development in Greenland


Chapter Seven

Resource Management and Institutional Structures in Greenland

Rasmus Ole RASMUSSEN

INTRODUCTION

Food security and renewable resource management issues are intimately connected. This is especially true for Greenland, where the principal income for the Home Rule Government is derived from subsidies from the Danish State—the so-called block grant—whereby 87% of Greenland's exports of DKK 2,251 million in 2001 consisted of fish products (60% of which were prawns). Fishing is the main industry, and it is estimated that about 2,500 people are directly employed in fishing, while about 3,000 people work in the fisheries industry and derivative occupations. Hunting is of direct or indirect significance for about twenty percent of the population, and is the main occupation in the municipalities of Qaanaaq, Upernavik, Uummannaq, Tasiilaq (Ammassalik) and Ittoqqortoormiit (Scoresbysund), while sheep farming and reindeer herding are most important in south Greenland. Consequently, renewable resource management is essential both at a national and a local scale.

Concerns regarding the need for management of resources in Greenland were first expressed by colonialists in connection with the first experiences of famine as a result of increased sedentarization. The move to permanent settlements led to a reduction in the traditional reaction of nomads to diminishing resources, namely to move away and start looking for alternatives. Instead, the settlement structure created increased local pressure on dwindling resources, and colonialists were left to deal with the problem. Some individuals, for instance Heinrich Rinch, Governor of the South Greenland District, felt responsible for the situation and were forced to react.

Since then, the management of renewable resources has been a central issue to development in Greenland. The focus of this chapter, however, is not so much on the history of renewable resource development as it is on present-day management structures. As a starting point, the concept of resource management as a global concept is discussed, followed by an overview of the main elements of resource management. The core of the presentation, though, is on the current situation, developed from the point when Home Rule was established in Greenland 1979 and responsibility for the management of renewable resources was devolved to the new government, leading to current management problems.

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RESOURCES AND MANAGEMENT

Not more than a generation ago, the supply of fish available from the world’s oceans, for most people, seemed to be plentiful. For many, fish was something to turn to when other options were exhausted. Servant’s contracts from a century ago included clauses such as ‘fish should not be served more than 5 days every week’ in most North-Atlantic countries. However, advances in our ability to catch, process, preserve, transport, and sell fish at an increasing pace seems to have exceeded the ability of fish stocks to reproduce. Registered catches have increased more than fourfold from 1950 to 1990 —from about twenty million metric tons to about one hundred million metric tons. And The United Nations Food and Agriculture Organization maintained in 1993 that thirteen of seventeen major global fisheries were depleted or in serious jeopardy (FAO 1995).

By the early 1980s, the expansion of the commercial fishing fleets in size and efficiency created a situation where abundance and average catch per day declined to a level that threatened reproduction for several stocks, and several fisheries became unprofitable without subsidies. A pessimistic estimate from FAO shows that, on a world scale, the commercial catch was worth $72 billion but cost about $92 billion to operate. Statistics on overall catch in recent years seem at first glance to remain constant, but an increase in the catch of low-value species used for fishmeal hides some of the real characteristics and value of the industry. The response from commercial fisheries has been investments in progressively more refined technology, and an increase in the intensity of the fishing effort. In order to provide a growing world population with high quality protein, fish-farming has expanded to become one of the most important developments in renewable resource management, so that today more than a fourth of all consumed marine products is farmed.

The exploitation of fish in Greenland has been dominated by demersal species, and surveys indicate that the composition has changed fundamentally since the early 1980s. At the same time, there has been a dramatic change in biomass and size structure of ecologically and economically important species. Changes in composition of the fisheries have been experienced before (Rasmussen and Hamilton 2001). Today, however, deep-sea shrimp and Greenland halibut are the only important offshore species, while fisheries in the shallow waters include capelin, lump-sucker, Greenland halibut, spotted wolf-fish and Greenland cod. Unless the mechanisms underlying these radical changes in the demersal system can be better understood, the response of the ecosystem to a changing environment will remain unpredictable, and basically unmanageable.

Similar concerns have been presented regarding the situation for marine mammals and seabirds, due to the influence of fisheries on the feeding habits of these animals, and a limited knowledge about the dynamics of the ecosystems. The marine mammal community reflects both Atlantic and Arctic influences, and at least 3.4 million birds are estimated to winter in the area. Although a variety of species are seasonally available in different parts of Greenland, more precise information on numbers, distribution, food habits and ecosystems effects is sparse. Local observations may contribute to a general understanding of the changing patterns of available stocks; many are contradictory, and seldom reveal characteristics of the dynamics of the ecosystems necessary for the long-term management of diverse interests.
Marine products have been important in the development of most Arctic countries, both as a basis for subsistence, and as a vehicle for modernization and economic and social change through industrialization. The fundamental approach for industrial usage of the arctic marine environment is the fact that it is among the most highly productive areas of the world, with a high primary production compared to global productivity, and a relatively stable long-term production, but with rather unknown fluctuations and short-term instabilities. Consequently, human activities in the Arctic require particular care and attention in order to operate efficiently and safely, with appropriate consideration of the vulnerability of the environment.

The current use of the marine environment and its impact on a sustained contribution to economic conditions of Arctic communities, undoubtedly, is important for the development process. The arctic marine environment is the basis for 10% of the global fisheries, a substantial part of the consumption of marine mammals in the world, as well as a crucial natural environment for many species of birds worldwide. A higher pressure on global resources creates a need for a fuller understanding of patterns of resource exploitation and its influence on the possibilities of a sustained resource usage.

The governments have a long-term goal of maintaining renewable resources as a continuous economic activity. They have responded to the changes and decline in resource stocks with regulatory regimes in an attempt to reduce over-harvesting, through three basic types of restrictions: 1) limits on the amount of time and space in which harvesting can occur, i.e., length of season, restricted areas etc.; 2) limits on the types of capital and labor used, i.e., number of hunters and fishermen, vessel size, technology type, etc.; and 3) limits on the amount of hunted animals and fish caught. But attempts to regulate seem to conflict with the interests of individuals and companies affected such regulations.

The real challenge to the sustainable management of renewable resources is to create a situation where conflicts are resolved, not by creating a once-and-for-all solution, but open for a conscious decision-making process that includes all stakeholders. This is not the situation in Greenland today, but the history of resource management in Greenland both show how perceptions have changed, and how management approaches are evolving slowly toward the ideal model.

**THE MANAGEMENT ISSUE**

There are many reasons for maintaining resource management efforts in Greenland today, and they can be summarized in four categories: management as a resource issue, management as an economic issue, management as a social issue, and management as a political issue (Rasmussen 1998a, 1998b).

Management as a resource is focused on the outcome of the management regime measured in terms of the state and character of the resource. There is a growing awareness of the fact that Arctic biodiversity is much more diverse and complex than generally described, and especially, the long-term impacts of human activities on the environment need to be better understood. The productivity of the system, however, is measured from a human perspective—a social construct that emphasizes one or only a few species, and applies limited knowledge about overall ecosystem dynamics. Consequently, a more comprehensive management regime requires a better understanding of the biological complexity of the environment,
enabling a management system that can address the three main problems: 1) determination, reflecting that the resources are constantly changing, and the variations and fluctuations are difficult to convert into manageable models; 2) under-utilization, whereby some resources are not used by commercial or subsistence fisheries, either because they are not commercially viable, are too difficult to process, or just not part of the consciousness of society (e.g., sea-urchin roe which has been available for centuries, but only became a component of the commercial activities during the last 10 years); and finally, 3) over-utilization, whereby certain species are over-exploited, and consequently depleted, not only because they are profitable, but because of availability and limited knowledge about the nature of the resource.

Management as an economic issue focuses on the outcome of the regime measured in terms of the economic framework—defining management approaches in economic terms, using a capital rationale. The focus is on the marginal return whereby investments will continue as long as revenue is generated, while optimal productivity of the stock usually is at a much lower level. This situation is further exacerbated when capital management is operating under a veil of uncertainty, and involves common pool resources. This approach, however, may conflict with other types of rationales, and consequently lead to misconceptions regarding the rationality of the economic approach. In short, renewable resource management is challenged by several factors: 1) non-optimal resource usage—economic rationality focus on marginal and not optimal profitability, creating disparities between the resource and the economic structures; 2) over-investment caused mainly by an economic approach to resource management and uncertain economic situations; 3) responses to external factors such as cost structures, world market prices, and the impacts of technological advancements on the quality of fisheries; and, 4) conflicting rationales, caused by different goals for production, and consequently differences in approaches to management situations.

Management as a social issue relates to the fact that renewable resource exploitation usually consists of many types of units as well as many types of objectives, basically represented in three main categories: 1) renewable resources as a core of identity; 2) renewable resource use as a means of maintaining and developing lifestyles and cultures; and 3) renewable resource as a means to economic and occupational development. Resource management must recognize structural changes as they occur, accept the changes, and adapt to them as a reaction to the change. Living conditions in the North are constantly evolving, and in order to cope, resource management must be able to respond to a series of social problems. First, there must be a recognition that there are differences in objectives, including marked differences in the interpretation of ongoing changes related to economic structures and resources. Second, management systems must respond to growing concentration and centralization as a result of development during the last decades. Third, regimes must recognize a generational gap problem which is twofold: the long-term consequence of availability of disposable income economic, leading to over-investments and ground-rent conditions created by commercial resource exploitation, which eventually leave a younger generation ill-equipped to enter the renewable resource sector. The other has to do with changes in objectives connected to a new generation taking over.
Management as a political issue relates to the question of maintaining the long-term economic and social benefits of resource exploitation within a political framework comprising many actors, focusing on questions of who is involved, with what rights, and with what consequences. The interdependency of the stakeholders creates the need for action, and for the formulation of rules and institutional frameworks for managing individual and collective behavior. Political management has evolved from internal problematics of de-colonization of a nation-state and a situation where political processes in the Arctic are a question of mutual arrangements between superpowers, leading to a situation of regime building, with many players in the game (Young 1994). On the one hand, there is involvement of public authorities in governance and regime-building; on the other, there is involvement of individuals and interest groups in sharing responsibility for the management of local and regional resources through co-management arrangements in a continuum of government-based management at one extreme, and user-group-based management at the other (Raakjær-Nielsen and Vedsmand 1995).

**EVOLUTION OF THE RESOURCE MANAGEMENT REGIME**

In the pre-Home Rule regime, the monopoly of KGH (Kongelige Grønlandske Handel or the Royal Greenland Trade Company) was decisive in terms of renewable resources. Three levels of decision-making were of importance.

The main responsibility for day-to-day resource management was delegated to trade posts and factories—one in the central town of each municipality, and a number of affiliated small-scale plants and trade stations in the settlements within the municipality. This created a high dependency of the local fisheries on individual managers, because the latter was the decision-maker in almost everything related to local resources. Even if profit was considered to be of importance for KGH in general, this was seldom considered to be the main objective of the factories. This added to the uncertainty for local hunters and fishers. This was not always a negative aspect, as a local manager might feel a deep social responsibility for the community, and try to manage according to what would be the best for the local population.

This was the situation when Home Rule was established, according to the law 577 of 29th of November 1978, which provided for the creation of Home Rule Government in Greenland, consisting of Landstinget—a parliament of 27 members elected by the inhabitants, and an administration—Landsstyret, managed by government. Accordingly, Home Rule Government was given the right to make decisions and to assume responsibility for most matters formerly handled by the Danish Government, and an initial plan for devolution was drafted. As a part of the preconditions for the home-rule arrangement, the devolution of responsibilities would be linked to an increase in the transfer payment from Denmark to Greenland.

**Means and Measures**

The Danish Government’s attempts to expand and industrialize fisheries in Greenland during the 1950s and 1960s had only relative success in creating a commercially viable and self-sustaining economic activity. Although the capacity of the fleet doubled from 1965 to 1975, the total volume of the harvest remained more or less stable at 50,000 tonnes. The Home Rule Government realized in 1979 that the changes in the cod stock were permanent and therefore, the cod fishery did not offer
a promising future for economic development. Legislators and biologists were well aware of the problems inherent in and expansion of the fisheries, and for many years, regulations based on preventive means of protecting juvenile fish through technical limitations on gear, minimum sizes, etc. was considered to be the only means of control. In addition, however, Total Allowable Catch (TAC)\(^2\) limits were introduced in the 1970s, and implemented through closure of specific fisheries when the TAC was reached.

With the introduction of Home Rule, a process was established which eventually led to the devolution of responsibilities for fisheries management. It became a de-facto situation by January 1, 1985. The large majority of the fishing industry was in the hands of monopolies—until 1985 by KGH; thereafter by the Home Rule owned organization Kalaallit Tuniassiorfiat (KTU)\(^3\), which later became the backbone of Royal Greenland. This monopoly turned out to be an excellent basis for managing renewable resources, as it enabled the government to be in control of where harvests should be allowed. In principle, the fisheries were open for all who wanted to participate, and would continue until the quota was reached, after which the fisheries closed. But other conditions could influence access; for example, the capacity at onshore facilities. During the 1980s this method of regulation was very commonly used, and caused severe limitations for fishermen at specific locales.

The industrialization and modernization of fisheries during the 1960s and 1970s had offset Home Rule development strategies at the start of the 1980s, but there were many components in the new strategies that differed markedly. Instead of centralization of investments and fisheries in a few locales, the new strategy emphasized a broader geographical structuring of investments as well as renovation of facilities in the smaller settlements. One reason for this approach was a confidence in the availability of local resources, as well as a general principle of ‘small settlements as the backbone of Greenland.’ At the same time, however, the creation of an avant-garde industry became an important element of the policy, and as a consequence the focus was turned toward the off-shore shrimp fisheries. Massive public investments were diverted to an increase in the public off-shore activity, especially in the shrimp-fleet, and, as an attempt to maintain processing activities in the larger fisheries-dependent settlements, investments in other types of vessels were also made. A 5-year development plan introduced in 1984 aimed at investments that would reduce dependency on a single species. The investments not only increased the capacity of the fleet, but caused an increased pressure on dwindling resources. The growing investments in the 1980s—public as well as private—in the fleet and in more efficient equipment increased the pressure on the resources to such a degree that the long time survival of shrimp fisheries was threatened. An evaluation of the situation in 1989 by ‘Fiskerirådet’—an advisory board which included all parties involved in fisheries—contended that over-fishing of about 30% was taking place,

\(^2\) The Total Allowable Catch (TAC) is the quota of fish and shrimp harvest minutes agreed upon by Greenland and Denmark and the international fisheries agribusinesses: NAFO for West Greenland and ICES for East Greenland.

\(^3\) After the Royal Greenland Trade Company (KGH) was taken over by the Home Rule government, it was split into a number of units, namely: Greenland Trawlers (GT)—the fishing unit, Kalaalit Tuniassiorfiat (KTU)—the production unit, and Royal Greenland (RG)—the trade department; later these units were joined again under the ‘Royal Greenland’ moniker.
and that drastic means to regulate fisheries were necessary. So a new management scheme was introduced in the early 1990s.

Two types of regulatory schemes were introduced, based on a division of the TAC between an off-shore and an in-shore segment. The first was an Individual Transferable Quota (ITQ) system for the off-shore shrimp fisheries similar to the system in Iceland. The off-shore fleet, defined as boats of 75 Gross Registered Tons (GRT) or more, were introduced to a system of distributed ownership of the quota segment. The total off-shore fisheries were divided among the owners of large vessels according to their fishing activities over previous years, whereby the owners received an individual share of the TAC; individually owned, quotas are totally transferable, with one limitation: the Home Rule Government has the right of first refusal on the quota share, but at full market price. The second was a capacity quota for in-shore fisheries—defined as boats of less than 75 GRT. The capacity is determined by the size of the ship, the specific equipment available, etc. Based on capacity, each fisherman is allocated a number of points. At the time the system was introduced in 1992, maximum capacity was therefore determined by the available capacity. A fisherman who wanted to expand his activities or get into fisheries, had to purchase more points. These can only be obtained from other fishermen who consequently limit their involvement in fisheries. The Home Rule can limit the total number of points available in the system by buying points at market price, just as they have the power to expand the fisheries by allocating or selling off more points. A running reduction of the value of the points is only possible when fishermen leave the fisheries and the Home Rule buys up points, and then resell only some of the points.

Even if discard was a serious problem before the introduction of the ITQ system for the shrimp fisheries, investigations conducted by the Department of Fisheries revealed that high-grading was becoming a serious threat to the resources, and the expected reductions in capacity did not appear immediately. Consequently, supervisors were placed onboard all off-shore boats to ensure that only discard of valid species and not discard due to high-grading would take place. The main objective is to maintain the largest possible public and private revenue from fisheries, and at the same time, maintain the resource. In addition to introducing supervisors, the recommended goals were: to respect the recommended TAC given by the biologists; to exclude excessive capacity of commercial fisheries; to being new research- and applied programs to promote the development of non-commercial species; to promote fisheries and production in small settlements; and, to support production projects with a high degree of local processing, in order to create value-added products on a larger scale.

The off-shore fleet has decreased drastically over the last ten years. Before 1990 more than 50 vessels were involved in off-shore activities, while today the number is below 20. Total capacity has not decreased, however. Instead, small and less efficient boats have been replaced with large, efficient vessels with state-of-the-art equipment, and the average quota for each vessel today is 2.5 times what is was in 1991.

The introduction of the in-shore capacity quota system had only a limited impact on the fleet structure, so by July 1, 1996 the system was replaced by an ITQ system which, within very few years had caused marked changes in the fleet. From a
group of 140 capacity-quota holders in 1993, the group has been reduced to 85 in 1997 and 75 in 1998.

In terms of economic efficiency, the management initiatives seem to have succeeded. But in terms of contributing to overall development of Greenland, with a focus on small settlements and small-scale fisheries and hunting as the backbone, the success seems to be very limited. In fisheries, there are very distinct differences between large- and small-scale activities, with structural and economic divisional patterns, as well as political relations to each that are important to the development process.

The fisheries industry in Greenland is divided in three sectors: offshore fisheries; inshore fleet, and small boats. The offshore sector is dominated by general tendencies of capitalism and centralized in large-scale projects and economies of scale as fundamental mechanisms. In 1993, the offshore fleet consisted of approximately 50 boats; today, there are fewer than 20. The fleet employs about 250 individuals on a full-time continuing basis and contributes a production worth more than 1.6 billion DKR, and is therefore responsible for more than three quarters of the total value of fisheries. Most of the catches are sold directly to the markets. Legal restrictions allow only one quarter of the catches landed to be processed by the fishing industry in larger settlements. The intermediate inshore fisheries sector is partly based on capital rationality, and partly on a lifestyle which has become the backbone of many of the larger settlements, and in many smaller settlements. The inshore fleet consists of about 250 mid-sized boats, and involves about 500 persons. The boats are limited to daily activities, but are able to cover larger areas close to shore and within the fjords. They account for a production worth approximately 400 million DKR, representing one fifth of the total income from fisheries. Finally, the small boat sector, vital for small settlements, and acting as a backbone of cultural heritage, and consequently important for direct and indirect political attempts to maintain reasonable living conditions in these places. The 2,500-small boat fleet involving approximately the same number of individuals, accounts for the largest majority of boats, and also the majority of people involved in fisheries. But the value extracted at approximately 100 millions DKR is only 10% of the formal economic outcome of fisheries. Activities for this sector are limited by the size of boat, and a focus on fisheries close to the settlements and within the fjords.

THE MANAGEMENT FRAMEWORK

As Home Rule established, the Greenlandic Government regulated the utilization of renewable resources by means such as quotas and technical restrictions (e.g., mesh sizes or closed seasons). The position of the authority has shifted through time, as illustrated in Table 1, so that renewable resources have been the responsibility of ministries for Industry, for Fishery, and for Environment. Today the responsibility is divided among all three ministries, which sometimes creates confusion regarding the decision-making power. As Table 1 indicates, the changes of responsibility has fluctuated not only to uncertainties regarding who should be in charge, but just as much a reflection of the political situation in the country. And exactly the same goes for the division of labour within the administration. Even before Home Rule was established, three parties dominated political life in Greenland: the social democratic Siumut, the more conservative Atassut and the left wing Inuit Ataqatigiit. Ever since
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The first elections, however, none of the parties has been able to form a majority government, so the political situation has led to governments formed by Siumut in coalition with one of the two other parties, or with Siumut as a minority government. In many ways, therefore, the organizational structure and the division of responsibilities between the different departments is a reflection of the power relation between the coalition partners and the political platform they have established for the coalition (Rasmussen 2003).

As of today, the scientific advice to the Government is entirely based on single-species assessments given for one year, with no predictive models for the medium or long term. The Greenland Institute of Natural Resources is responsible for providing scientific advice on the level of sustainable exploitation of the living resource to the Greenland Government, including long-term protection of the environment and biodiversity. The fishing and marine mammal hunting in Greenland, however, is founded on resource assessments and quotas given by international advisory organizations and committees on fishery and marine mammal management of which Greenland is a member, just as the government in several cases has delegated decisions of local importance to the municipal governments. So a full picture of the present resource management situation in Greenland includes both international, national, and local decision structures.

The International Setting
Greenland is currently involved in a large number of international commissions, committees and organizations aiming at adjusting resource usage to capacity. Four organizations have had the most important and profound influence on the everyday life of Greenlanders; they are therefore described briefly here.

ICES, the International Council for the Exploration of the Sea, is the oldest intergovernmental organization in the world involved in marine and fisheries science. It was established in 1902 in Copenhagen as an outcome of conferences held in Stockholm in 1899 and in Christiania (Oslo) in 1901 as an arrangement between eight countries. The concern of the Council is the Atlantic Ocean and its adjacent seas, and its program of multi-disciplinary work is aimed at understanding the features and dynamics of water masses and their ecological processes. Its most important function is to promote and coordinate research activities, and to function as an intergovernmental marine science organization with the purpose of providing information and advice to member country governments and international regulatory commissions (including the European Commission).

In 1979, ICNAF, the International Convention for the Northwest Atlantic Fisheries was replaced by a new Convention which established NAFO, the Northwest Atlantic Fisheries Organization. Its primary objective is to contribute through consultation and cooperation to the optimum utilization, rational management and conservation of the fishery resources of the Convention Area and to promote scientific research and cooperation among the Contracting Parties to this end. The need for a new organizational framework was prompted by the creation of the EEZ—Economic Exclusive Zones—and the extension of the jurisdiction over the living resources to limits of up to 200 miles by the Coastal States of the Northwest Atlantic.
Table 1. Changes in the departmental structure of the Home Rule

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Both ICES and NAFO uphold great prestige and their recommendations are generally recognized as unbiased, and taken seriously by the nations involved in fisheries within the jurisdiction of the organization. Both organizations are serving as role models for similar arrangements established during the last decades. In practical terms this means that the development of Northern fisheries today is almost covered by independent organizations mediating state-of-the-art knowledge about stock development for major fish stocks on a governmental level. To what extent this involves participants in fisheries, however, is quite another question. It is up to participating countries to decide which national procedures should feed and tap into the arrangements, and it differs very much between the arctic countries.

As regards the management of marine mammals, Greenland is a working member of NAMMCO, the North Atlantic Marine Mammal Commission, an organization aiming at providing a scientific basis for the management of marine mammals, similar to ICES and NAFO’s management of fisheries resources. On a yearly basis Greenland is awarded quotas on small whales subjected to regulation, and provides the organization with scientific data relevant for the monitoring of the stock. Regarding large whales, Greenland is given quotas by the IWC, the International Whaling Commission, of which Denmark is a member, and includes delegations from both Greenland and the Faroe Islands in negotiations.

National Regulations—Fisheries
The first regulation of foreign fisheries occurred with the EEZ expansion from three to 12 nautical miles in 1963. This mainly affected Portuguese fishermen, but a 10-year allowance of fisheries up to 6 nautical miles was established for France, Iceland, Norway, Portugal, Spain, UK and Germany (Smidt 1989). The large international fishery was reduced following Greenland's assertion of a 200-mile EEZ in 1977. But since Greenland (together with Denmark) was a joint member of the European Community, EC rules had to govern its fisheries (Smidt 1989). Danish participation in Greenland fishing continued, with some limitations, until Home Rule took effect. Since the 1960s it was required that all Danes involved in fisheries in specific areas within the 12-mile EEZ should have an address and live at least half the year in Greenland (Nørrevang et al. 1971).

The basis for the present legal organization was the creation of Home Rule in 1979. All activities did not immediately devolve to the Greenland Government, but a process was started, aimed at full devolution by January 1 1985 (Lage and Rasmussen 1993). Following a popular referendum, the Home Rule Government withdrew from the European Union in 1985, allowing Greenlanders to assume responsibility for fisheries regulation (Smidt 1989).

The first law concerning fisheries was passed in 1984; the present complex of the legal framework governing commercial fisheries is based on the Landstingslov nr. 17 of October 22, 1990. Several major amendments have since been made, including those of November 1991, October 1992 and May 1993. The regulations include a number of basic principles (presented and discussed in Lage and Rasmussen 1993). One component of the fisheries management system provides for the regulation by means of preservation and technical conservation measures, whereby the Government is authorized to create restrictions of time periods, areas, and use, as well as types and characteristics of equipment. A fundamental principle is the regulation of access to commercial fisheries through quotas reserved for vessels.
and owners of vessels from Greenland and recognized as Greenlanders. However, it is possible for the Home Rule administration to make exceptions. Another main principle relates to resource management regulation by setting TAC and limitations on access to resources. It is a political decision usually taken once a year by the government, but based on recommendations from biologists. The regulation is based on four different types of licenses: time-limited licenses with and without quotas, and time-unlimited licenses with and without quotas. It is up to the Home Rule government to decide what type of license (if any) should apply to a given fishery, except for the shrimp and salmon fisheries which both, according to the law, require licenses. In the case of the shrimp fisheries, the law requires time-unlimited and transferable quotas which can be sold. Where licenses are not required, the fisheries are open to all Greenland vessels as long as the overall quota has not been used to its limit. And for species where no quota has been set, there are no limits on fishing.

The first international rules regarding the cod fisheries appeared in 1968 as a technical regulation related to mesh size. In 1974, international regulation was introduced, with an annual quota determined by the NAFO, a part of which was reserved for Greenland. The TAC was based on a biological evaluation of the resource. Following the 1977 expansion of the EEZ, virtually all of the cod was reserved for Greenland; a limited bycatch of cod was permitted for German trawlers catching redfish (Sebastes sp.), and certain other fisheries (Smidt 1989). With the exception of a few years, cod has practically been absent in Greenland waters for the last decade, and the annual TAC has not been reached for several years. Instead an exchange agreement has been made with Russia and Norway which enables two Greenland trawlers to fish in the Barents sea, while boats from Russia and Norway have access to redfish and Greenland halibut in the Greenlandic sea.

Salmon was once a high value fishery, but political pressure from European and North American recreational fishermen drove regulation of the salmon fisheries. The expansion of Greenland’s salmon fishery in the mid-1960s led to calls for international intervention; an attempt to totally ban fisheries for salmon was presented in 1969, but it wasn’t until 1971 that regulation took place (Nørrevang et al. 1971). ICNAF/NAFO established a yearly limit of 1,200 tons in 1972 for Greenland alone, based on an average of the catch for the previous three years. Today a limited yearly quota is distributed among small-scale fishermen.

Until the 1950s, shrimp were pursued mainly by inshore vessels. With the expansion of the shrimp fishery to the outer banks, broader regulations became necessary. The introduction of TAC was the first general regulation of the shrimp fishery. In Greenland it created incentives for overinvestment and overcapacity, because the fishery was open to everyone until the TAC level was reached. To reduce capacity, and find a better means of regulating the fishery, two types of quota arrangements were created: 1) a Government Order 6 of April 8, 1991 determines the regulation of vessels above 75 GRT in an ITQ system. The total TAC was divided among those shipping companies involved in shrimp fisheries at that time, in proportion to their catches during the previous 3 years. Companies were permitted to sell their entire share or parts thereof, with the selling price determined by the free market. The Home Rule was given the precedent to purchase the TAC-share in order to reduce fishing activity, or to redistribute the share. 2) Government Order 32 of November 21, 1991 determined the regulation of vessels below 75 GRT in a Capacity Quota system. The regulation was set according to the number of points
given to each fisherman involved in the fisheries, based on his activities in the previous years and technical capacity, i.e., vessel size, gear type, etc. The points were transferable, and it was possible to upgrade capacity by buying a certain number of points and upgrading gear. Due to the positive experiences with the ITQ system in the off-shore fisheries, a similar quota system was introduced in the in-shore fisheries in 1997.

Greenland halibut has turned out to be the second most important fisheries, next to the shrimp fisheries. Its expansion during the 1990s and experiences of collapses of local stocks resulted in the 1997 regulation of in-shore fisheries based on licenses. The off-shore fisheries is regulated through TAC-setting and licenses, but most of the off-shore fisheries of Greenland halibut has been traded to foreign vessels in exchange of cod- and shrimp-fisheries in foreign waters.

**National Regulations—Wildlife**

By January 1989, the responsibility for environmental protection was transferred from Denmark to Greenland, and prepared by the Home Rule Government with Landsting Statute no. 12 1988 on the Protection of the Environment. Amendments were made with Landsting Statute no. 7, 1993, which consolidated several areas that had formerly been regulated by other legislation.

In 1993, the law regarding Hunting License was introduced, according to which all persons wanting to participate in hunting must obtain a valid hunting license. There are two types of licenses: full-time hunting and leisure-time hunting. The full-time hunting license permits commercial and subsistence access to all resources unless specific regulations limit access, while leisure-time hunting limits the amount of animals to be hunted, and is primarily aimed at hunting and fishing for subsistence. Amendments were introduced in 1999, whereby the criteria for obtaining a full-time hunting license were defined as follows:

- one must have close links to the Greenland society
- one must have been registered in the National Register for Greenland for the preceding two years
- one must have been fully liable to pay tax to Greenland for the two preceding years, and
- one must have a gross income from hunting and fishing of at least 50 per cent of his total gross income. Gross income from fishing with vessels larger than 150 GRT/210 GT is not included.

In order to qualify for a leisure time hunting license, one must be registered in the National Register of Greenland. Both full-time and leisure-time hunters are eligible to hunt several species for which a quota has been fixed, for example caribou and musk oxen.

As of February 1, 2000 more strict rules regulating eligibility criteria for acquiring a hunting license was introduced, whereby at least 50 per cent of an individual’s net income has to be derived from fishing/hunting. Crew members on off-shore vessels and larger trawlers are excluded from this regulation. In the future, licenses will only be issued to persons who have been registered in the National Register of Greenland, and have been permanent residents for a period of two years before applying. In order to continue to obtain the license, both leisure-time and full-time hunters will have to report the result of their hunting throughout the year. These
reports are identified by person when they are received by the authorities, but the information is only used for statistical purposes.

**Terrestrial Mammals and Birds**
Hunting for caribou and musk oxen is limited to a yearly quota. In addition to a valid hunting license, participants acquire a special license for caribou and musk ox hunting. Caribou/reindeer regulations were enacted in 1996 after a two year ban on caribou hunting in West Greenland. Previously, such hunting was free for everybody with a valid license. The hunting is limited to the period 15th of August to 10th of September. The total quota is divided into municipal quotas, distributed so that 75% is allotted to full-time hunters while 25% is allotted to leisure hunters. For the latter the tags are distributed through a lottery system. During the last two years, a remarkable recovery of the stock has taken place, leading to a situation where hunters have been asked to go hunting for additional animals in order to keep the stock at a manageable level, thereby preventing a total collapse of the species in a few years. Musk oxen has been available for hunting on the west coast since 1996. There is a quota on the number of animals available to hunt, and about one third of are available during the winter hunting (March-April) while the remaining are to be hunted during August and September.

In general, animals and birds are protected during the breeding season, and in several cases limitations have been introduced concerning means of transport and access. As a general rule all mammals may be exploited provided no limits on, for instance quotas and closed seasons, have been imposed. In contrast, all birds are protected if no hunting season has been announced. Leisure hunters are limited to a maximum of 10 guillemots per hunting trip and these only for personal consumption.

**Marine Mammals**
A number of species are only available for hunting with a full hunting license. At the time of writing, these species includes fin whale, lesser rorqual, walrus, and polar bear. For the municipalities of Upernavik, Qaanaaq and Illoqqortoormiut there is a special permission for leisure hunters to hunt walrus, polar bear, Beluga whale and Narwhal in the National Park and the Melville Bay reservation.

Until now, seals have not been regulated, but as a result of negotiations with Canada, Greenland will draw up an executive order on the protection and hunting of seals in Greenland. But so far this has not been done. For small whales there are regulations regarding the hunting of beluga and narwhal that include limits to vessel size, so that only small vessels are allowed to participate in the hunting and to sell the products, and only full-time hunters may participate. Since 1995, encirclement hunting for beluga and narwhal has been prohibited. Large whales are subject to international catch limits, and the quotas for Greenland are determined by the IWC. The hunting of blue whales, Greenland whales, humpback and sperm whales is prohibited, while there is a quota on lesser rorquals and fin whales; the quotas on these are distributed only to full-time hunters.
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Protected Areas
There are six protected areas in Greenland:
- The Quingqua Valley in Nanortalik municipality (largest birch forest in Greenland)
- The Island Akilia in Nuuk municipality (old geological occurrences)
- The Arnangaaarmup Qooruia in Maniitsoq municipality (exceptional animal and plant life, as well as cultural heritage)
- The Lyngmark at Arctic Station in Qeqertarsuaq municipality (unique flora)
- The Melville Bay between Upernavik and Qaanaq municipalities (one of two summer habitats of the narwhal)
- The National Park in Northern and Northeastern Greenland.

In addition, there are 11 Ramsar areas, but on which no Greenlandic regulations have yet been decided.4

An amendment by Landsting Statute no. 14, 1996 introduced regulations on traffic with power-driven means of transport in built-up areas and all forms of traffic in open country. In the Finance Act for 1996 and the years following, appropriations have been included for the development of environmental technology. It will primarily be diverted into technology for the improvement of disposal of sewage in the settlements.

Local Regulations
Locally, municipalities may pass bylaws that make specific restrictions regarding wildlife and hunting. These restrictions are decided on by the local government, and can be subject to change at short notice.

First, municipal authorities are responsible for territorial planning of the settlements, and therefore permission is needed from them for activities that have implications for land-use. All land and sea territory is common property; therefore, it is impossible to own. Special permissions allow restricted use, and may be granted in connection with an activity that requires land management, for example where the land resource is managed by the Sheep farmers Organization. As for housing, municipal authorities issue permits for public as well as private building activities. Houses may be privately owned, but the land on which they are built is still common property, temporarily loaned to the owner of the house as long as it stands. But municipal planning authorities are not working entirely on their own, since they are not managers of lands owned by the municipality, but owned jointly by the people of Greenland. All plans regarding territorial design and land use, therefore, must be approved by the Home Rule Government's planning department, and in principle by the Home Rule Government.

One of the most noticeable local regulations restricts the use of snowmobiles for hunting and fishing activities. For several municipalities, there has been a principle that snowmobiles should be banned, partly because of the damages they

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4 The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty that provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 144 Contracting Parties to the Convention, with 1,421 wetland sites, totalling 123.9 million hectares designated for inclusion in the Ramsar List of Wetlands of International Importance.
can cause to wildlife, and partly to maintain the dog-sledging tradition. Slowly, however, these restrictions tend to dissipate, and snowmobiles become a common means of transportation in the hunting districts. Due to its importance, this case will be discussed in further details below.

There are also municipal restrictions related to access to bird cliffs. In several cases, local authorities use restricted access by limiting the means of transportation that can be used for hunting in such or such areas.

Regulation of the Food Sector
The food sector is essentially managed according to the same conditions as food production in Denmark. The industry is constantly monitored by veterinary services, and production facilities and processing environments must meet international standards. All production facilities aimed at the export market (such as Royal Greenland) are evaluated at least once a year by the Danish Ministry of Food, ‘Fødevareregion Nordjylland’ (Region North Jutland). In principle, the same level of quality is required for home market production, and all home market producers (such as Neqi) are monitored by the Greenland veterinary authorities. Local producers—for instance home-based slaughtering of sheep in South Greenland—are also monitored by the Greenland veterinary authorities, just as are the local market places—Brædtet. The municipalities manage the market places, and bylaws regulate infrastructure requirements, such as tap water, proper sewage etc.

Monitoring the Responsibility
For several decades, the authority has been exercised in two different ways. The first is by means of inspection and license control. Inspections are conducted by the ‘Grønlands Kommando’ (the naval inspection fleet stationed at Grønnedal, South Greenland, as well as their aircraft based in Narssarsuaq) and the police force, who do practical inspection of a ships’ catch, fishing gear etc., when in harbor.

As mentioned before, a serious problem of discards presented formerly occurred among the high seas fleet—up to 90% of the shrimp caught have at times been discarded due to small size (Lage and Rasmussen 1993; Rasmussen et al. 1998). Small shrimp bring only a fraction of the price of the large shrimp on the Japanese market. In order to control the problem, in 1989 the Government introduced an amendment to the law and required inspectors stationed on board the vessels, to provide a continuous check on fishing activities, reducing opportunities to discard. In the beginning only one controller was installed onboard, but this proved to be insufficient as it was difficult for one person to withstand pressures from the crew, and impossible to observe 24 hours each day, so discarding could still occur. As a result, two inspectors are now installed onboard all high sea vessels fishing in Greenland waters.

A second important—and more political—means of authority has been through the management of fish processing plants. In most cases, these were the only place where fish could be sold. By limiting the time periods of purchase it has been possible to place restrictions on fisheries with very short notice. In some instances—probably most of them—restrictions have reflected real limits in processing capacity. But there have also been situations where purchase closures were used as a means of resource management (Rasmussen and Hamilton 2001).
PROBLEMS AND PERSPECTIVES

The history of resource management in Greenland shows many aspects of relevance for future development in the Arctic. There are two interrelated questions which epitomizes the issue. One relates to the interpretation and management of alleged over-harvesting, the other with the interpretation of management for the maintenance of culture and tradition.

Over-Harvesting
Renewable resources in Greenland, throughout time, have been exposed to numerous examples of over-harvesting, with severe social consequences. Commercial whaling by foreigners from the 15th century onward practically wiped out the Greenland whale and caused unrecoverable damage to other species, and has been the most consequential and obvious example to date. In many other cases, it can be difficult to determine the culprit—human action or environmental change—and to what extent consequences are due to malpractice or simply bad luck. There is no doubt that the decline of the cod stock in the 1970s and 1980s was caused by changes in sea temperature, but the total collapse of the stock was definitely also a result of a decade of over-harvesting, and it can be argued that the stock’s lack of ability to recover could be explained by human behavior (Hamilton et al. 2003).

Today, discards can be considered among the most severe examples of over-harvesting (Rasmussen 1998). One way of improving the quality of the catch is to filter out the less costly part, so discarding of lower valued fish (‘high grading’) becomes more frequent. Discard is more or less the consequence of two characteristics connected to the intensification of fisheries. 1) Due to regulations, catches of disallowed species and of fish of the wrong size is not only superfluous, but illegal, even the fisheries causing the superfluous catches is conducted in an accepted manner. 2) Due to imperfect knowledge about market conditions by-catches of unusual species is considered of no value. In both cases, the result is the discard of substantial parts of the catch.

An economic analysis of fisheries in 1992 suggested a number of initiatives aiming at a reduction of the over-capacity, and among other activities public funding in the range of 100 millions Dkr were set aside for this purpose. However, the most important initiative was the introduction of supervisors onboard all off-shore boats, to ensure that only discards of valid species and not for high-grading would take place. In maintaining the resources, the recommended goals are: stay within the recommended TAC suggested by biologists; avoid excessive capacity from commercial fisheries; start new research- and development fisheries to promote the development of currently non-commercial species; promote fisheries and production in the small settlements; and support production projects with a high degree of local processing, in order to create value-added products on a larger scale.

It is easy to agree upon such obvious examples of over harvesting, but it is much less easy to agree upon when it concerns the small scale hunting and fishing activities which are considered to be the backbone of the culture and history of Greenlanders. Two approaches may illustrate the situation:

In today’s modern Greenland hunting, fishing and trapping is taking place in a way that is ecologically and economically unsustainable.
The unchecked use of living resources is taking place as if the present generation of Greenlanders were the last inhabitants on planet earth. (...) Each species is a testimony to the tragic story and the consequences of decades of blind exploitation of living resources. And this destruction of the biodiversity in Greenland appears likely to continue to the bitter end. (...) Some species will undoubtedly become extinct. Additionally, there are intangible losses: Culture, identity and respect from the outside world. (...) An ancient proud hunting society will be reduced to a bitter shadow land of denial and repression. (Hansen 2002, Preface)

Greenland's history and mode of production inform a system of ideas about the appropriate use of living resources, including whales. Greenlanders desire to eat locally available, nutritious, and culturally valued foods, just as their ancestors have done for generations. Doing so means killing whales and other marine mammals. With this activity comes an awareness of the responsibility they have toward conserving these resources and sharing them with others. Generations of experience in the Arctic have produced the realization that ecological conditions can change almost overnight, and that flexibility and adaptability are essential ingredients for survival. Flexibility means holding to the belief that new technologies may well be necessary to cope with changing conditions and to take advantages of new opportunities. Not every hunter in Greenland can perhaps articulate these ideas, nor are they held consistently by all; but by and large, these ideas and practices have enabled Greenlandic society to sustain itself for generations. (Caulfield 1997: 168)

The first approach by Keld Hansen illustrates the unconditional environmentalist where any registered or assumed change is interpreted as a consequence of human misbehavior. The second approach by Richard Caulfield illustrates the respect for a history of adaptation to change, and a confidence in humans who have been able to adapt, who will also be able to respond to new challenges. A third approach could just as well be included, namely the traditional defense mechanism: 'We are coming from a hunting culture, so we are per definition sustainable in our management of nature.' The polarized approach has been counter-productive when means and measures in preservation of the environment are discussed. Similar differences in perceptions are frequently uttered in the mass media in Greenland, often leading to very harsh debates.

Table 2 shows the status of major renewable resources in Greenland. Most of the species are declining, and several are at a level where it may be difficult for the resources to recover. A few are increasing, but that does not necessarily mean that this will continue. Just a few years ago the reindeer stock was almost decimated and it is commonly accepted that this was the result of natural fluctuations. Therefore with or without precaution measures, the stock will eventually decline. Finally a few species are listed as stable. However, these are tagged with a question mark since further research is necessary to predict the future of the stock with necessary certainty.
### Table 2: Status of resources in Greenland

<table>
<thead>
<tr>
<th>Status</th>
<th>Danish name</th>
<th>English name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreasing</td>
<td>Ederfugl</td>
<td>Common eider</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Torsk</td>
<td>Cod</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Fjeldørred</td>
<td>Arctic char</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Spættet sæl</td>
<td>Harbor seal</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Rødfisk</td>
<td>Redfish</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Havterne</td>
<td>Arctic tern</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Hellefisk</td>
<td>Greenland halibut</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Hvalros</td>
<td>Walrus</td>
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<tr>
<td>Decreasing</td>
<td>Hvidhval</td>
<td>Beluga</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Isbjørn</td>
<td>Polar bear</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Kammusling</td>
<td>Scallop</td>
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<tr>
<td>Decreasing</td>
<td>Polarlomvie</td>
<td>Brünnich's Guillemot</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Kongeedderfugl</td>
<td>King eider</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Krabbe</td>
<td>Snow crab</td>
</tr>
<tr>
<td>Decreasing</td>
<td>Laks</td>
<td>Salmon</td>
</tr>
<tr>
<td>Increasing</td>
<td>Moskusokse</td>
<td>Musk ox</td>
</tr>
<tr>
<td>Increasing</td>
<td>Grønlandssæl</td>
<td>Harp seal</td>
</tr>
<tr>
<td>Increasing</td>
<td>Klapmyds</td>
<td>Hooded seal</td>
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<tr>
<td>Increasing</td>
<td>Reje</td>
<td>Shrimp</td>
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<tr>
<td>Increasing</td>
<td>Rensdyr</td>
<td>Reindeer</td>
</tr>
<tr>
<td>Increasing</td>
<td>Gæs</td>
<td>Geese</td>
</tr>
<tr>
<td>Stable?</td>
<td>Narhval</td>
<td>Narwhale</td>
</tr>
<tr>
<td>Stable?</td>
<td>Ringsæl</td>
<td>Ringed seal</td>
</tr>
<tr>
<td>Stable?</td>
<td>Finhval</td>
<td>Fin whale</td>
</tr>
<tr>
<td>Stable?</td>
<td>Vågehval</td>
<td>Minke whale</td>
</tr>
<tr>
<td>Stable?</td>
<td>Remmesæl</td>
<td>Bearded seal</td>
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</tbody>
</table>

*Source: Hansen 2002.*
It is generally recognized that speedboats have contributed significantly to the decline of bird colonies, not because of the noise (which was originally considered the major problem), but because they provided easy access from the sea to the cliffs. Some over-harvesting is related to commercial activities, leisure hunting, sometimes for subsistence, but often simply for fun, has contributed greatly to the decline of the stocks. So it is not just a question of technology, but also of attitude toward the resources, wherein older Greenlanders often emphasize how young people, by their attitudes and actions, have contributed to jeopardizing the traditional respect of the resources. This critique, however, has been met with the traditional defense mentioned earlier: ‘We are from a hunting culture, so we are by definition sustainable in our management of nature,’ which has been a very counter-productive argument when the means and measures of preservation of the environment are discussed.

Most of the data used to create the list—and for most of the information used in the disputed book—stem from official sources in Greenland, first and foremost from Pinngortitaleriffik—Grønlands Naturinstitut (Greenland Nature Institute), the Greenland Home Rule's center for environmental research. It is responsible for acquiring knowledge about the renewable resources in and around Greenland, including monitoring their status and changes. This knowledge is primarily aiming at creating an adequate basis for advising the Home Rule regarding the management of the resources, and their results are generally accepted throughout Greenland as being valid.

The question is not so much the validity of the information—to what extent the resources are actually endangered—but the way the message is submitted to the public and becomes a part of the public discourse.

Management for Culture and Tradition?
When managing resources, one also manages the cultures dependent on the resources. The case of sled dogs versus snowmobiles illustrates this interdependence, and indicates how difficult and sensitive management, with all good intentions, may appear.

The introduction of new technologies has been a part of the ongoing cultural adjustments. For instance, guns have been part of the reality in Greenland for the last 200 years, and have become an integral part of the culture. However, there still exists a ban on automatic and semi-automatic weapons for hunting activities; only simple rifles (for mammals) and shotguns (for birds) are allowed. Similarly, motorized boats, introduced in the 1920s, were well-adapted in the culture of both hunters and fishermen, without any serious considerations regarding limiting access and usage of these amenities.

The imaginary dividing line for the use of dog sleds is the Polar circle; the most southern town is Sisimiut (Holteinsborg). People south of this line may have dogs, for instance sheep dogs for sheep farmers in South Greenland, or as pets. The line has been chosen primarily because historically there was no use for sled dogs south of this line, since their use was closely connected to hunting for sea mammals on the ice in winter. Of course, they have also been used as a means of transportation, but only among hunters of sea mammals. South of Aasiaat (at the entrance to the Disco Bay) there is no sea-ice cover during winter, only to Sisimiut is
there usable ice cover on the fiords, allowing transportation to suitable fishing and hunting places where fast currents keep the water open during winter.

A hundred years ago the number of sled dogs was about 500 per 1000 inhabitants in North and East Greenland. From 1900 and until the 1930s there was an increase to a level of approximately 1,000 dogs per 1,000 inhabitants, which was due to an increase in commercial hunting and ice fishing. By 1940 it was estimated that there were a total of 8,500 sled dogs in North and East Greenland, with the majority in the North. From 1945 to 1970, Greenland’s population doubled while the number of dogs quadrupled, implying an increase in hunting activity as well. However, these were not exactly correlated because the increase in the number of dogs was due not to an increase in productivity, but in the use of sled dogs in the fisheries as well as for leisure activities.

The number of sled dogs has been rather stable during the last 30 years due to the ban on snowmobiles. The ban pre-dates Home Rule, and follows a tradition to colonial time when Danish colonial authorities emphasized that Greenland should be kept more or less isolated from the outside world in order to preserve the traditional culture. This general principle was modified during a modernization period in the 1950s and 1960s. Following the introduction of snowmobiles, the argument was maintained, partly because the culture of using sled dogs was considered valuable, and partly because the impact of noise from snowmobiles was considered an important factor limiting hunting possibilities.

When Home Rule took over in 1979 there was no interest in making marked changes to the ban on snowmobiles. The interest among hunters for buying snowmobiles was very limited, first because they were proud of their skills, and secondly because there was not any economic benefit in changing. Still, in 1988 the law regarding muskox and reindeer hunting was adopted by Parliament, where it was stated: “§ 9. Aeroplanes, motorized vehicles and snowmobiles are not allowed to be used in connection with hunting,” so essentially banned snowmobiles for hunting.

But the same year, the law regarding bird hunting was adopted by the Parliament where it was stated: “Stk. 2. Municipality bylaws may however specify that transportation to and from a hunting site by means of a snowmobile may be allowed under certain conditions.” This led to opening of the use of snowmobiles, but for many years all municipalities actually maintained the principle of not allowing the use of snowmobiles for hunting purpose, and for several municipalities, the use of snowmobiles for hunting is still banned.

A new step was taken in 1998, however. A revision of the law regarding muskox hunting stated: “Stk. 3 The Home Rule Government may permit the use of snowmobiles as means of transportation in connection with muskox hunting. Stk. 8. The Home Rule Government may also permit the use of other motorized vehicles when transporting the animals away ... just as the use of helicopters from and to the hunting area may be used in connection with tourists paying for leisure time hunting of musk ox.” The municipalities can no longer introduce their own regulations regarding the use of snowmobiles and other motorized means of transportation for musk ox hunting. The change came about because trophy hunting has become an important potential income source for hunters, and tourists seldom spend enough time to do long transports by slow dog sled. It is important to note that this hunt is only allowed with a professional hunter accompanying the party. The industry generates income both for the tourist agency and for the hunters as well.
Parallel to the lifting of restrictions on snowmobile use has been a remarkable decrease in the total number of sled dogs during the last few years, to about one third of the previous level. The obvious interpretation is that the lifting of the ban has led to the replacement of sled dogs with snowmobiles. The growing acceptance of snowmobiles definitely contributes to the decrease of sled dogs, but a major factor is the increased costs connected to their maintenance. Indeed, even though hunters can get dog food from the fish processing plants at reasonable prices, a total of about 100 tons of dog food is imported every year, which is expensive, and it has become more and more difficult to hunt enough to cover the costs.

There is no reason, however, to believe that the tradition of dog sledging will disappear. There are still hunters who want to maintain dogs as part of their hunting, and at the same time offer the possibility of dog sled riding for the tourists. And, of course, the dog sleds are a nice leisure activity for the population.

Managing dog sledging may be open for interpretations, and three different approaches should be outlined.

First, one may well argue that the ban on snowmobiles has enabled the maintenance of a traditional activity characterizing North Greenland culture. Without the ban, the result might have been the same as in Canada and parts of Alaska where snowmobile use is widespread and dog sleds almost disappeared. It is important to keep in mind, however, that this has only been a part of the North Greenland culture, simply because this was only possible and needed there.

Second, one may also argue that the ban on snowmobiles has preserved a symbol of the traditional hunting society, while the culture in the meantime has changed substantially. The number of sled dogs has not reflected the real need through the 1970s and 1980s, but the fact that the culture changed, from a situation where dogs were needed for production and subsistence, to one where they were also needed for leisure purposes. This is even more clear when we see that the number of hunters has declined overall—from a situation in 1945 where approximately 8,000 individuals were full-time hunters, depending on hunting in North and East Greenland, to today where the total number of hunters with full-time licenses is less than 2,000. So the ban on snowmobiles has preserved the activity, and thereby the symbol, of the culture, but at the same time, the individuals behind the culture have changed substantially.

Finally, one may just as well argue that the ban on the use of snowmobiles has contributed to the decline in the number of full-time hunters, thereby actually contributing to the disappearance of the culture, and just acted as a custodian maintaining the symbols. The use of dog sleds limits the activity radius, and consequently potential hunting activities, leading to lower income. It may also be argued that acquiring and maintaining a snowmobile is costly, but running a full-functioning dog team is equally expensive, and with a much more limited resource access. The most important argument, however, relates to the interests of the youth. Many young people may have been raised with skills in sled dog management, but they have been more interested in snowmobile racing and similar activities, and have chosen to leave the trade, simply because it does not give the technical challenges they seek.
REFERENCES


Arctic Food Security


Chapter Eight

Food Transportation and Supply Networks in Greenland

Josée ARSENAULT¹

INTRODUCTION

The food supply for a population changes according to socioeconomic, cultural and technological changes. The 19th century, and the industrial revolution (also occasionally known as the transportation revolution), was characterized by the emergence of new means of transportation that radically altered the frequency and speed of supply (Merlin 1991). Planning, which, broadly understood, designates the rational organization of development (Simard 1977) only became a more structured practice at the turn of the 20th century (Chabot and Duhaime 1998). Various development planning methods came into being and evolved differently according to the political and institutional contexts of each country and territory (Merlin 1991).

For a long time, transportation planning was limited to the organization of urban traffic (Frybourg 1974; Merlin 1984). The importance of developing an integrated system was an emerging idea, and was often limited to ground transportation planning. Hence, planning was designed for a specific project; a comprehensive and integrated transportation system plan did not yet exist. While transportation planning is still addressed sectorally today, increasingly, external factors (environment, socio-economics, etc.) are considered within a broader geographical framework (Transports Québec 1998). This trend has resulted in the emergence of a host of government initiatives (programs, strategies, plans) aimed at coherent action plans and improvements to transport systems for an entire territory. These new integrated planning principles are being documented in European countries such as Sweden, Germany, and France as well as in the United States, where federal law makes transportation planning obligatory. In Canada, several major transportation plans have been drawn up over the last 30 years, but these have been limited almost exclusively to urban centres (Transports Québec 1998). But what of planning approaches for the North?

In northern regions, often characterized by remoteness and isolation, the risk of interruptions in the supply of merchandise is often compounded. Food supply depends on what transport planners in southwestern Alaska have called a ‘lifeline’ for local communities (State of Alaska 1999a and 1999b). Indeed, the links, often coastal, are vital for travel by individuals and for ensuring the circulation of the

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products they consume. Difficult climatic conditions are important, given that characteristics of northern environments play a critical role in logistics planning such as transport and associated costs (Hulsey et al. 1993).

Despite these constraints and risks, the northern regions of North America only began engaging in planning exercises in the mid-1990s. This may seem late, but it is important to bear in mind that infrastructure is rather recent in most cases. For example, in the Nunavik region, with the exception of two airports operating out of former military bases, the infrastructure serving 12 of the 14 communities were only systematically modernized in the 1990s after ratification of agreements between the Government of Québec and the Government of Canada. In such regions, everything seems to indicate that infrastructure and services were integrated and developed more or less spontaneously without deliberate coherency. Among the northern regions of the North American Continent, the State of Alaska was the first to consider transportation planning, having tabled a multimodal transportation plan for the southwestern region of the state in the early 2000s. At that time, the northern region of Alaska, like Nunavut and Northern Québec, had barely begun to consider the issue.

The situation in Greenland appears to be an exception. Indeed, the country has experimented with planned socioeconomic development—since the early 1950s by the Danish state, then towards the end of the 1970s by the Greenland Home Rule (Adolphsen and Greiffenberg 1998). These on-going planning exercises were not specifically directed toward transportation; however, we felt that this sector should be included, given its importance in the economic development of the territory.

Indeed, the social and economic development of Greenland and its activities and infrastructure stands as a model of integrated planning for the world (Adolphsen and Greiffenberg 1998). Originally, this structured planning approach emanated from a project to create a modern society with development possibilities, so that Greenlanders could experience a standard of living comparable to that of Danes and, in so doing, reduce their dependence. All sectors were included in this integrated planning. The development of the commercial fishery and product processing sectors were given priority; territory and land use methods were dependent on this approach. For example, villages were built near bodies of water to promote the development of the fishing industry. Other factors influenced the permanent settlement of populations, in particular the possibilities for road and wharf construction, as well as access to a supply of products, preferably year-round (Adolphsen and Greiffenberg 1998).

As for transportation, increased investments and a focus on technology provided for the development of a more integrated approach, making possible a rapid development of transportation networks beginning in the 1960s (Government of Greenland 2000). Transportation infrastructure was distributed over the territory rather than being concentrated in certain areas, and although priority was given to sites offering the greatest economic potential, the system was founded on and created a network of interdependent links. In Greenland, as in other northern regions where villages are distant from one another and from concentrated populations in the south, the arrival of modern transportation put an end to the isolation and established ‘stable supply networks that promoted a continuous entry of imported goods’ (Duhaime and Godmaire 2002).
Chapter 8: Food Transportation and Supply Networks in Greenland

However, the unprecedented development of Greenland highlighted the immensity of the needs and the absence of private enterprise. In fact, Danish businesses were not interested in investing in Greenlandic production (Adolphsen and Greiffenberg 1998), and the government had to compensate with heavy investment in a modernization of the territory. While the public deficit grew toward the end of the 1960s, massive efforts were made to increase productivity in the fisheries sector, in particular by promoting fishing for shrimp, an abundant resource. The Greenlandic fishing fleet doubled between 1965 and 1975 as a result (Morin 2001).

The scope of the task and the rapid pace at which development took place led to some confusion and the need to establish committees in different economic and social spheres, beginning in the 1960s, to coordinate and control development projects that were being established across the territory. The Greenlandic Committee (GC) was created with a mandate to prepare a 10-year development scheme that integrated all activities within a single and comprehensive territorial plan that considered the economic, sectoral, spatial, and social aspects of development. These approaches were intended to secure future investments and ensure constant and stable development. Until the latter part of the 1970s, this intensification of development planning occurred outside any legislative framework; indeed, the Land Use Act was not passed until 1977.

This documented process of integration provides insight into Greenland’s food supply system. The hypothesis is that the planning culture that became firmly rooted necessarily led to a structured system of transportation and of food supply chains that would ensure stability and reliability. This idea is reinforced by the fact that Greenland is a vast territory with small populations scattered along the coasts where there are no road links between communities or cities, creating a major dependence on imported food.

This study deals specifically with the food supply considering, in particular, that appropriate planning constitutes a major challenge in a northern territory. We will document the food supply network as well as service providers who are part of this network. Our study focuses on the circulation of imported food products for trade purposes, namely a distribution model that implies trade between economic players, paid for using a common currency (Duhaime 2002).

**FOOD SUPPLY CHAIN**

The food supply chain is characterized by several stages through which the quality of a product must be preserved and the cost of handling minimized (McGregor 2000; Colin et al. 1986). When food is shipped, it is important that all stages of transport are meticulously structured to ensure that the quality of the product is preserved and that transportation costs are kept to a minimum all along the supply chain; that is, from the point of departure to the point of arrival.

The logistics of transportation, understood in the broadest of terms, includes the entire life cycle of a product—namely, from production, to marketing and distribution (Ruibal Handabaka 1997; Guillosson 1998). This study focuses only on the distribution of products. For this reason, we have chosen a definition that confines logistics to distribution:
Hence, logistics concerns all operations determining the movement of products, such as: the location of factories and warehouses, supply, physical management, packaging, stocking and stock management, handling and preparation of orders, transportation and delivery tours. (Colin et al. 1986). (free translation)

The value of this definition resides in the fact that it allows us to clearly visualize the point of departure of the food (plant or warehouse) as well as its point of arrival (delivery to the consumer or the distributor). While this definition does not specify a management approach to logistics, it nevertheless is well adapted to the framework and the needs of this study.

During the food supply process, the product must pass through several stages, from its point of origin to its final destination. The schema provided in Fig. 1 illustrates ten main stages of supply.

![Supply chain diagram](https://via.placeholder.com/150)

**Figure 1:** Supply chain. Summary made by the author based on: D’Avignon and Miller, 1998; Colin et al. 1986; Ruibal Handabaka 1997; Morency, 1996; Bruno and Paquin, 1992.
These stages are: the planning of needs, orders, packaging, grouping and preparation, loading, transportation, storage, delivery, distribution in stores and final sale to consumers. As it is a complex process, certain stages may be repeated, depending on the product’s final destination.

Forecasting of needs is an important preliminary step to ensure that there is an adequate food inventory to meet the needs of the clientele. Inadequate forecasting can impact the cost, availability, or freshness of products and can lead to an eventual supply shortage or a surplus. Once forecasts have been made, an order is placed with wholesalers who supply retailers.

Packaging must be adapted to the product and to the handling to which the product is subject during transportation. The materials used to package food products are usually wood (often for fruit and vegetables), natural fibers, plastic, corrugated cardboard or paper, metals (sheet metal or a thin sheet of stainless steel) for the transport of some liquids such as milk, wine, etc. The choice of packaging, often a compromise between security, promotion and cost, must protect the merchandise effectively against various risks (Mercantila Publishers 1989). In addition, it must maximize the use of the transport unit and, in so doing, reduce transportation costs. Another important function of packaging is to ensure easy-to-read information on handling and delivery, on which quality and timing of delivery may depend.

The precautions that should be taken into account when shipping a product can be summed up by four directives: 1) describe the product (classify it, define its size and weight for customs and pricing purposes); 2) specify the terms agreed upon with the customer (date, time of delivery, terms of sale, etc.); 3) identify the transportation equipment required; and, 4) inspect the merchandise and make sure the packaging is suitable for the merchandise being shipped and the means of transportation used (Ruibal Handabaka 1997).

The product or container loading or unloading stages are important to prevent costly problems. For all types of loads, it is imperative to allow air to circulate between the packages and to avoid overloads to prevent problems of rot and an accumulation of moisture (Emo and Tinel 1997). The precautions that should be taken can be summarized as follows: 1) use the anchor points on the sides and floor of the transport unit (container for example) and fill empty spaces; 2) protect the doors in the event of sliding; 3) to avoid damaging the merchandise, place, notably: the merchandise in bags in alternate layers, barrels upright, separated by boards, merchandise on pallets against walls, and fill the empty space in the middle, light packages on top of heavier ones, merchandise classified by type of packaging, odiferous merchandise separated from similar products, and liquids separated from solids: solids must be placed above liquids and be separated by a board.

Transport itself entails several risks. Ruibal Handabaka (1997) summarizes these as: 1) mechanical (vibrations, impacts, etc.); 2) physical (piling, weight, etc.); 3) heat-, cold-, and weather-related (freezing, condensation, mould and mildew, etc.); and, 4) risks that are specific to each type of transport: rail and road (acceleration/deceleration, impact), maritime (pitch, sway, swell), air (take-off and landing, turbulence, atmospheric pressure, etc.). Other risks that apply more specifically to transporting goods over long distances and times include: 1) theft (mainly during transshipment); 2) fire (flammable products but also caused by spontaneous combustion from repeated friction); 3) contamination (e.g., by residues or odours when non-compatible products are loaded side-by-side).
Storage is a transition phase between two stages, where loading cannot take place immediately after unloading and transportation. Whether it involves short- or long-term storage, the precautions to be taken are the same. To maximize air circulation during storage, space must be left between the merchandise and the walls and between the top layer of cargo and the ceiling. When different sizes and types of storage containers are used, or a space is not full, empty boxes or other materials must be used to buffer the space, to ensure uniform air flow around the merchandise (Mercantila Publishers 1989).

Service Providers
When a product moves through a supply chain, several service providers may contribute simultaneously or in succession to the process. Some providers offer several types of services, ensuring several stages of the process by the same outfit. Moreover, the same type of provider might re-enter the supply chain at various stages. While there are specialty services at each stage (packager, loader, carrier, distributor, etc.), some service providers such as shipping agents can take care of a series of activities. It may happen that the sender or the carrier has qualified staff to package and load, for example.

Hence, a multitude of possibilities exist. In a comprehensive analysis, the service providers at each stage must be identified. These clarifications help identify who, among the service providers, has responsibility for the products transported at successive stages, from the time the product is obtained from the carrier, to distribution at the final destination (Emo and Tinel 1997). In this way, it is possible to identify the requirements and constraints for the entire supply chain (Colin et al. 1986). However, it is hard to know the costs associated with the transportation of the merchandise at each of these stages owing to their great diversity and heterogeneity (transportation, storage, handling, etc.) and the multitude of service providers involved.

Complementary Elements
In addition to organizing the supply chain and service providers, other elements must be considered, namely: the supply flow strategy, the type of merchandise, and the nature of the product. Indeed, these elements are important in that they dictate the approaches that must be adapted accordingly.

Strategic Flows
There are two strategy types for the distribution of a product, namely the ‘pull flow strategy’ and the ‘pushed flow strategy’ (D’Avignon and Miller 1998). Basically, the pull flow strategy is an autonomous system, where each retailer or group determines its needs according to its sales without considering the combined needs of other merchants. An absence of coordination of the supply can cause an overabundance or a shortage of a certain product. The push flow strategy uses a broker model, where products and quantities are determined by a central warehouse in anticipation of the needs of all retailers, which may lead to an increase in efficiency and a reduction in costs. However, this system is effective only if the central warehouse has all the data of the retailers, and requires some type of computerized inventory management system (D’Avignon and Miller 1998). On a limited basis, a third less commonly used
flow strategy, known as a ‘tactical system’ relates to the acquisition of supplies that are provided at temporary low prices by suppliers.

**Types of Merchandise**

Ruibal Handabaka (1997) identifies two main types of merchandise. The first is bulk products—material that is not packaged individually, usually stored in tanks or silos. This type of container is mainly used to transport grain. Whether liquid or solid, bulk is mainly reserved for land and maritime transport. There is no bulk transport of food in Greenland.

The second type brings together merchandise in packages of various sizes and is divided into two subgroups: isolated (single packages) or unitized (units grouped together in a larger package container). Isolated packages are handled and transshipped separately in parcels, boxes, etc., whereas unitized packages are organized on pallets, i.e., packages of merchandise are placed on wooden flats, and handled by forklift. Various types of merchandise lend themselves to different methods of transport.

**Nature of the Product**

It is important to distinguish between non-perishable and perishable products, as the method of preservation and the attention required differs from one product to another. Perishable products are divided into three subgroups: dairy products, meat, fruit and vegetables, and may be fresh, refrigerated, or frozen, as the case may be.

*Non-perishable food*—This category includes canned products, dry, or vacuum-packed products. The transport of non-perishable food poses few problems; however, attention must be paid to products stored together. Specific knowledge is required to determine transportation and storage requirements for diverse products, especially in those cases where products have more fragile packaging such as plastic bags, as in the case of nuts for example.

*Perishable food*—For perishable food products, the transit time from the point of origin to the destination, as well as the ambient temperature are very important. These products are transported under controlled temperatures in refrigerated (fresh products) or frozen conditions. This ‘cold chain’ imposes technical constraints related to transport and storage, in particular regarding the coordination of service providers to avoid any break in the chain (Artous et al. 1998). As temperature is of prime importance for refrigerated products, it must be maintained just below the freezing point and kept very low and constant for frozen products (Mercantilas Publishers 1990). All the necessary precautions must be taken during the transport and handling of these foods to preserve characteristics of freshness (odour, colour, taste) (Ruibal Handabaka 1997). Perishable products have a recommended temperature and limited storage period.

Perishable products can be classified into various groups, each requiring a high level of specialization in the logistical chain. These groups are fruit and vegetables, meat (fresh or frozen), and dairy products (Artous et al. 1998).
General Characteristics of Food Transport in Northern Environments

In northern regions, the circulation of foodstuff generally takes place from suppliers in the South to wholesalers and retailers in the North. While it has been shown that in some Arctic communities, 80% of seniors and 45% of people in the 18-34 age group eat traditional food every day (Myers 2000:1-2), external influences on the traditional food economy have resulted in changes in consumption patterns that increasingly rely on imported food products. Research conducted in Nunavik by Duhaime et al. (2002) showed that 87% of the diet of the Inuit in this territory comprises imported products.

In northern regions, the demand for a specific mode of transport depends on the presence or absence of other means. For example, in isolated communities or cities that are not served by land or marine transport the pressure of demand will be enormous on air transport as the only means of distribution. The availability of more than one mode of transport in a given community reduces its vulnerability, as alternatives exist. However, still today, many northern communities and cities depend exclusively on air transportation for their supply, whereas other communities and cities benefit from seasonal transportation such as maritime in summer and snow or ice roads in winter (temporary roads made of hard-packed snow; length of use depends on winter conditions). The costs of these seasonal modes of surface transport are lower than the cost of air transport (Indian and Northern Affairs Canada 1990).

In northern regions, the cost of living is very high and transportation expenses in these environments are a key component of the cost of foodstuff, as Kaduck (1999) demonstrated for the Northwest Territories, for example. A comparative study of Nunavik and Metropolitan Québec City for the prices of certain products revealed a higher cost of living at northern latitudes that underscored the high cost of foodstuff and the potential of inconsistencies in supply as well as the lack of freshness and quality of some products (Duhaime et al. 2000). Other studies show that isolation necessarily leads to little competition between suppliers, which has a negative impact on the variety and price of products (Ordre des diététistes du Québec 1996; Olson 1992; Duhaime et al. 2000).

METHODS

The transport of foodstuff or other products and the logistical aspects of transport systems have been well documented in Québec and elsewhere in the world (Artous et al. 1998; Böge 1996; Colin et al. 1986; D’Avignon and Miller 1998; Emo and Tinel 1997; Goussot 1998; Guillosson 1998; Jean et al. 1992; Journet 1998; McGregor 2000; Morency 1996; Sussman 2000). However, the particular case of transport in northern regions has not been addressed, and it would appear that issues are still poorly known, despite the fact that research has been conducted for several years on various phenomena.2

2 See the following volumes, among others, that provide extensive bibliographies of studies dealing with the North, focused on socioeconomic and natural sciences: AMAP working group (2002); Bone (1992); Caufield and Kojima (2000); Chaturvedi (1996); Duhaime et al. (1998); and, Minority Rights Group (1994).
To make up for this shortcoming, we conducted interviews with service providers using a model organized around three main questions: Who are you? What do you do and how do you do it? What do you think of...? The discussion went from general to specific and successively concerned the state, the activity and the opinion of the subjects interviewed.

**Sampling, Interview Procedure and Observations in the Field**

The selection of the persons to be interviewed was made on the basis of the ‘non-probabilistic by reasoned choice’ sampling technique, which ‘seeks to increase the information while limiting the number of elements selected’ (Bellalite 1997). From the outset, we knew that there were a limited number of service providers in Greenland given the relative importance of the market and the high level of state ownership of services. The precise identification of the persons to be interviewed was made on the basis of information collected from the Danish embassy, from the Internet, and from the contact list found in *This is Greenland 1999*.

The objective was to select the main service providers and socioeconomic players of the transportation system and to ask questions allotted to each of the following: distributor, shipping agent, maritime and air carrier, representative of municipalities or public organizations (socioeconomic players) and representatives of public bodies in charge of transportation. This objective was met, and a total of 18 persons were identified, namely: five distributors (retailers or company representatives), three forwarding agents, four representatives of carriers, a regional organization representing municipalities, two public organizations in charge of transportation, and three socioeconomic players in fields that could influence the dynamics of transportation planning and contribute to our knowledge of the overall socioeconomic context of Greenland.

Between June 3, 2002 and June 21, 2002, sixteen interviews were conducted in the cities of Nuuk, Sisimiut, Illulisat, Aasiat and Ilmanaq. Upon our return to Québec, we held one interview with a carrier from Greenland operating in Montréal. The number and the diversity of the interviews conducted provided sufficient data for an analysis of the main characteristics of and key issues related to the food supply system in Greenland.

To limit potential biases, the interviews were all organized and conducted in the same way, namely in the form of a discussion. Before beginning the interview, a project briefing was made to introduce the interviewer to the participant/s, put the study in context, describe how the interview would unfold, and make the person feel at ease by establishing an atmosphere of trust. The interviews were of the semi-directed type, which means that the orientation of certain general questions had been planned in advance, according to a reference framework, but that the sub-questions asked varied according to the answers obtained from the respondents. It was thus possible to ‘re-orient the discussion at certain moments’ to take into account the ‘interaction with the person met and to adjust the discussion in order to complete the information’ (De Ketele and Rogiers 1993).

All of the interviews in Greenland were conducted in English and recorded on audio tape except for one interview held in Ilmanaq (an isolated community of 111 inhabitants), where the answers to questions (in Inuktitut) were relayed through an interpreter to allow us to gather general information concerning the food supply. On average, the interviews lasted between one and one and a half hours.
**Processing of Data**

In all cases, the information was recorded during the interview, to ensure that no information was lost. Next, the results of the interviews were summarized and organized according to themes, which facilitated subsequent analyses. All the interviews were transcribed and translated into French, except for certain excerpts which we left in English. To complete certain data or address certain gaps in information, subsequent contacts were made by e-mail. When additional information was obtained, it was added as an appendix to the interview summaries.

Additional observations in the field were collected. They were directly related to the interviews or were related to specific occasions, for example, at the time of the visit to a grocery store or of the observation of the transshipment of a vessel at a port, the tour of this same vessel, etc. This information was collected in the form of brief notes in a personal log book.

A consent form (provided in English) guaranteeing confidentiality was presented to each interview participant before the start of the interview. Aside from the fact of reassuring the persons interviewed regarding the confidential and appropriate treatment of the data, the introduction to the session also provided the opportunity to define the objectives of the research.

**The Food Supply Chain in Greenland**

The characteristics that emerge from this analysis do not all form an inherent part of the supply chain, but they always influence its operation, whereas other characteristics are strengths or weaknesses of this chain. All of these characteristics have impacts on fluctuation of costs, availability, or quality of food products.

**Shortages of Merchandise and Planning**

During our interviews, several instances of shortages in the food supply chain were identified. These situations, which occur in the everyday life of Greenland’s inhabitants, are even more common in smaller communities and may affect the shelf life of food. The impacts of these shortages influence the availability and quality of merchandise at the distributor level. This element of insecurity in the supply chain is illustrated by a comment made by a shipping agent:

> It is a bit wild west regarding transport up here. I mean that it doesn’t necessarily go as planned with transport, we have to know people to keep the transport work right and that’s for both sea and air freight. (service provider, Nuuk).

Distributors are also very much affected, as their work directly impacts planning of food supply and demand. They have to be constantly attuned to the market and react as quickly as possible since transport issues impose strict time limits.
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I have not been in a town (...) in the south, very small town, we have also Pissifik and Brugsen but 2-3-4 times a year there were no potatoes in town. When one shop misses its order, the other shop is very quickly sold out. (service provider, Nuuk).

Distributors are also influenced by factors that are hard to control. Examples include the receiving products that are damaged such as apples, or that are not ripe such as bananas. This leads to problems of management of supply and pricing. In the case of bananas, they are transported by boat. When they are shipped, they are green to allow them to ripen over the long trip. A distributor may have in his warehouse bananas that are still green from the previous shipment and may receive a new load of bananas. As a result, he will not have any bananas to offer until his reserves ripen. He will then find himself with too many, and the following two weeks, he will not have any bananas to offer again.

Practices Not Suited to the Context and Adverse Weather

The difficulty of planning and quality control may also stem from poorly adapted practices on the part of some service providers, such as overly long handling during loading or unloading, a lack of knowledge about storage conditions and characteristics of the territory such as long distances and climate. In this latter case, perishable food undergoes the greatest deterioration when weather conditions are difficult. Often, it is the combined effect of human and climate factors that cause the greatest damage to food. Packaging to protect against freezing exists but, as we saw earlier, its use is often minimized due to transportation costs.

The vagaries of the weather may also effectively increase delivery time, which is exacerbated when the product is sent to small remote communities and several transfers are necessary.

The normal situation is that it’s (the food) coming here (Illulissat) in very fine condition but of course you can have periods with bad weather here and bad weather in Kangerlussuaq and bad weather all around and then it’s suddenly 2 weeks old. (service provider, Illulissat).

When products arrive damaged, it is difficult to identify the stage at which the damage occurred. Indeed, the service provider responsible for the quality of the product is not well identified at each of these stages. Because the product is only inspected upon arrival, it is hard to prove that it was damaged during transport. In the final analysis, it is often the distributor who must foot the bill, since even if recourses can be exercised against the carrier, the preservation of the quality of the transported merchandise is not his responsibility and, moreover, food transported in the North is not insured. The Arctic Convention only indicates that carriers assume certain expenses, known as special duties, up to the value of the merchandise transported. But is it hard to demonstrate the carrier’s responsibility in the deterioration of food, based on what a service provider (Nuuk) told us:
At the time of a change in the means of transportation or between two different stages in the supply chain, there is no structured way of doing a follow-up on the merchandise from Denmark up to its arrival at destination. For example, as air carriers are under no obligation to store or deliver merchandise and as their role is limited to transporting the merchandise, there is no way of ensuring the quality of services (service provider and socioeconomic player, Illulissat).

Photo 1. Difficult ice and fog conditions on the trip from Illulissat to Ilmaniaq in June. Source: Josée Arseneault

Few varieties of products reach small communities, and sometimes the products are insufficient in quantity or in poor condition but offered at a high price.

They get (the product) bad, but anyhow they put it in the store. (service provider, Nuuk).
Food prices are generally high even in the case of food of questionable quality and that is a problem. (socioeconomic player, Illulissat).

In contrast, grocery stores of the capital Nuuk carry a variety of products, including a number of exotic fruits; however, consumers have to be willing to pay a high price for these products.

As for the transportation of food, owing to the chronic lack of space allocated for cargo on domestic flights in Greenland, the transit time to a small community of northern Greenland can reach fourteen days from Denmark. (service provider, Nuuk).

Today (…) we have only the vegetables, we haven’t received our meat products yet. The plane (with the meat) arrived yesterday in Kangerlussuaq but sometimes we have problem with internal plane so some of my goods still in Kangerlussuaq, about 20 boxes. This town (Nuuk) haven’t real big problem with the flight, the other towns in Greenland it’s very bad. I have often taken some of their goods here because it was better for the company that I take it; the other possibility was to waste it. (service provider, Nuuk).

The problem is amplified during certain times of the year, such as summer and during holiday periods, in particular at Christmas, due to the increase in the number of travelers and a greater volume of mail.

Actually what you do if you have chilled product and you have mail, you prioritize the chilled product and put the mail away and that’s illegal. Depending (…) what do you want; the letter from Mary or the fresh orange juice? (service provider and socioeconomic player, Nuuk).

In light of these limitations, respondents admitted that they circumvented the regulation requiring that priority be given to mail over food.

Deficient Equipment and Transportation Time
Another problem with air transport is the lack of equipment for frozen or refrigerated products in some aircraft. The fact that the services offered are not the same for all aircraft or company creates problems related to temperature change and breaks in the cold chain. For example, Air Greenland offers a ‘Frozen transport’ service on some of its aircraft whereas Air Alpha, the other airline, does not offer this service.

A product that must go from Kangersualujjuaq to Qasigiannguit, located in northern Greenland, will necessarily have to do part of the trip (between Illulissat and Qasiannuguit) without being refrigerated (service provider and socioeconomic player, Illulissat).
The same situation applies to all destinations served by small planes or helicopters. Between Copenhagen and Kangersuallujuaq, this is not a problem as the temperature is controlled in the cargo plane.

As for maritime transport, small communities are highly critical. In fact, transport time has increased. Whereas in the early 1990s, small communities were visited twice a week, since 1995, they have received a boat only every eleven to fourteen days. This gives rise to a great deal of dissatisfaction, in particular with respect to the quality or freshness of the merchandise on the one hand, and the price on the other.

For these two modes of transportation (air and maritime), Greenland has quality infrastructures that are 100% reliable. Technically, optimum transport conditions are assured for at least 16 ports equipped with vertical sides, making it possible to draw alongside and facilitate transshipment operations. This means a very significant decrease in the time it takes to complete operations as well as in risks. The 12 existing airports are modern and functional, but have shortcomings in terms of refrigerated warehouses and hours of operation. In both cases, the infrastructure is insufficient to meet needs. For example, certain remote northern communities are not yet served by maritime infrastructures and barges are still used to ferry in food supplies. Wharves should be reinforced and in some cases, access to the storage area should be improved.

Limited Market and Economic Orientations
Small populations, with small demands for food, makes investments in remote communities difficult. The limited number of persons to be served gives rise to price constraints and has an impact on the market structure. Moreover, as the entire market is not lucrative enough, the various socioeconomic players and even the service providers indicate that it would be difficult to divide the market. Opening the market up to competition would mean that another company would have to take over the entire market to become profitable.

The competitors would have to have all the market again to be competitive and there won’t be more competition. So if you have a privatize set up without competition the Home Rule seems to prefer now a Home Rule set up without competition because they will be more like morally responsible by assuring a certain level of price so that people can survive. (socioeconomic player, Nuuk)

Service providers who operate in Greenland are qualified and experienced; they have adapted their operation to the particularities of the market. This is also true for those who have been operating for less than 10 years (two private forwarding agents and a private carrier) but who come from their experienced Danish subsidiary. However, for private forwarding agents, the structure of the current market characterized by a monopoly by state-owned transportation company, the Royal Arctic Line, and problems resulting from the abolition of the policy of equal prices throughout the territory, poses such
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constraints as to threaten their very existence. (forwarding agent, Nuuk).

Indeed, while the Home Rule seems willing to examine the impacts of the abandonment of the single-price policy, for example, time is working against private enterprises who say that they are being hard hit by the impacts of these new orientations (socioeconomic player, Nuuk).

In light of observations on the characteristics of supply chains, we note several deficiencies. The efficiency of the supply chain is unequal depending on the means of transportation, the seasons or the destinations. For example, even if we were able to identify the service provider for each stage of the transport, this did not allow us to determine who was responsible for the quality of the products at each stage. Each service provider, although specialized in his field, improvises at some stage of the supply chain, their actions justified by specific and sector-related arguments.

Moreover, political change favoring privatization beginning in the mid-1990s has strengthened this finding. The arrival of private forwarding agents, and more intensively since 2002 with the privatization of Pissifik, followed by the timid opening of maritime and air markets are examples of this phenomenon. Certain decisions that fit in with this neo-liberal orientation, such as abolition of the single-price policy, call into question the survival of private service providers in some sectors who, until now have absorbed most of the increases in transportation costs, and who today say that they face unfair competition due to the presence of public enterprises in the same activity sectors.

Finally, we find that Greenland does not benefit from global and articulated planning for transportation and food supply. Indeed, we were unable to identify any tool, plan or even organization, having a mandate to study supply networks or the interactions between various means of transportation.

CONCLUSION

This study shows that Greenland benefits from modern transportation infrastructure networks, the location and vocation of which have been carefully planned, to ensure a reliable food supply for its population. In general, the supply system works and only very rarely does it lead to critical shortages. However, at the present time, Greenland does not benefit from any rational transportation planning. This is surprising, considering that the development of transportation infrastructure and services began in the early 1960s.

Today, the neo-liberal advances of the markets increasingly dictate development in all activity fields, and transportation is no exception. There is no longer an economy directed, coordinated, and controlled by the State, but rather a chain reaction that increasingly responds to the needs of the market, and a problem resolution mode that is even more compartmentalized as it is dictated by the requirements of competitiveness and profitability.

If one considers the potential for distortions in the content of the interviews due to the competitive context, it is possible that the concerns related to the absence
of planning were hidden in the comments that we obtained. Indeed, as the choice of the method used and the resulting collection of information were based on the goodwill of the persons interviewed, we must admit significant distortions related to the new neo-liberal economic context in which stakeholders in the transportation chain are interacting. It is this other level of sensitivity that we sought to obtain from the socioeconomic players; however, a survey conducted among consumers might have provided additional insight into this question.

The fact remains that in the cities visited there is a general coherency in the supply chain. It is hard to know if the same phenomenon applies for the entire territory. However, given that the same players are present throughout most of the territory, the analysis should apply to Greenland as a whole, bearing in mind that the remote communities of the east and far north experience some of the aforementioned problems more acutely, in particular, the increased potential of a break in the supply chain and the deterioration of foodstuff.

In general, however, everything occurs as if development provided a structure and a planning culture that promotes a spontaneous convergence of behaviors. Indeed, a certain form of planning, not dictated but rather implicit, seems to exist in Greenland, and although it is not coordinated and deliberate, the interventions made by stakeholders in both private and the public sectors seek to offer adequate service and ensure that the supply chain works as a whole. This is not to say that breakdowns in the supply system do not occur, and depending on the means of transportation, the seasons, or the destination very critical situations can result as regards food security.

If this is true, this research could lead us to conclude that perfect and deliberate planning, embedded in an integration tool, is not necessarily vital to ensure the operation of a food supply chain. Planning is perhaps also an element that may be introduced in a system through a ‘natural’ channeling of actions and maximizing the interrelations between the various stakeholders. However, when commercial interests prevail, there is a real danger that ultimately only the lucrative markets will be served to the detriment of remote communities with small populations.

We believe that the problems that generally remain unresolved or at the very least misunderstood in the supply chain in Greenland could be examined in greater detail, and even resolved, with the establishment of a global vision of the stakes associated with this supply chain and the identification of intervention priorities in transportation. The development of a transportation integration tool could make it possible to ensure fairness for less lucrative remote markets.

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Chapter Nine

Community Viability and Socio-Economic Change in the Barents Euro-Arctic Region: Reindeer Herding as a Condition for Well-Being and Food Security in Northernmost Finland

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The political and inter-ethnic context of the Barents Euro-Arctic Region

The residents of northernmost Europe (the northern parts of Norway, Sweden, Finland, and European Russia) have experienced rapid socio-economic and political changes since the late 1980s and early 1990s when the dividing line of the bi-polar world between East and West gradually disappeared. These changes had been caused by the transition in the Soviet Union from a controlled and often rigidly closed system impeding international and regional relations to a broadly open system guided by free-market forces and less restrictive communications and exchanges within the state and across political borders. After the firm establishment of the Soviet Regime in the Northwest by 1920 and exacerbated by the Cold War after

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1948, northernmost Europe, i.e., northern Fenno-Scandia and the Russian European North, was divided factually into the eastern and western regions with little contact between them for a period of 70 years (Granberg (ed) 1998).

In the West, in post-war Fennoscandia, governments were concerned with the reconstruction of their respective northern areas, except in Sweden, in the aftermath of devastation inflicted by the armed forces of Nazi Germany in 1944/45. The emerging Nordic model of the paramount welfare state stressed equal opportunity and access to public services for all its citizens, wherever they might reside within the national territory, across the Nordic countries under the Nordic Council. For the northern areas, the perceived periphery of these Nordic states, this also meant maintaining and sustaining an appropriate number of permanent residents affording equal standards for socio-economic conditions and well-being, including health and quality of life, set for the nation as a whole. In general, it can be stated that the Fennoscandian states have achieved this goal, and asserting territorial sovereignty, through considerable subventions without incurring a substantial decrease in the population base.

The Soviet Union, for its part, invested heavily in human and natural resources in developing its northern areas to expand industrial extraction of resources, create an umbrella of military protection and security, and enhance the infrastructure mainly for internal mobility and trade. These developments caused a large influx of people, for example, into northwestern Russia which, in the mid-1990s, outnumbered northern Fennoscandia with four against less than one million inhabitants (Granberg (ed.) 1998; Lausala and Valkonen 1999; Seppänen 1995), thus with the highest concentration and density in the circumpolar metropolitan areas of Murmansk and Arkhangelsk.

The regions of northernmost Europe are characterized by a cultural and linguistic diversity that has evolved over a long period of time. Long-term contacts across cultural and linguistic lines have been established, albeit not always without altercations (WCCD 1993). The juxtaposition of indigenous and immigrant populations and/or minorities and majorities are a fact of everyday life and are still the cause of major concerns over territorial claims, resource utilization and human (i.e., cultural and linguistic) rights. The aboriginal peoples in both northern Fenno-Scandia and the Russian European North, for example the Sámi (Aikio, S. et al. 1994, Sámi Instituhtta 1990) and Nenets (Tuisku 1999), live in centralized states in which they are encapsulated, often not having direct access to decision-making processes. Norwegians, Swedes, Finns and Russians—the historic immigrants residing in these northern tiers—are fully represented by their 'nation-states' whose role, e.g., in the West as the Nordic welfare state, is questioned by these aboriginal peoples. These circumstances have led to dynamic processes that will shape the future of local northern residents. This is not to say that there are no conflicts within the national or majority societies as exemplified by the existing south-north discrepancies, between center and periphery, with respect to economic development and political power relations from Norway, Sweden, Finland to Russia.

The disappearance of the 'iron curtain' in northernmost Europe has had a profound effect on interrelationships between the various regions and their residents. To cope with and accommodate these changes, new structures facilitating and increasing exchange and cooperation have emerged built upon the interconnectedness of all regions in northernmost Europe socio-economically,
culturally and politically (cf. Bröms et al. 1994; Granberg (ed) 1998; Käkönen 1996; Stokke and Tunander 1994). One such new structure is the Barents Euro-arctic Regional Council, founded in 1993, that provides a framework for interregional cooperation across international boundaries. Furthermore, the northern extension of the European Union into these areas with membership of Finland and Sweden as of January 1, 1995 has changed the conditions for socio-economic development and levels of well-being. Future expectations of local residents are quite often contradictory. In particular, there are many concerns about this critical phase of transition in Russia. In Europe, in particular within the European Union, future developments in industrial and environmental management are combined with expectations of progress in commercial and economic performance, increasing demands for comprehensive security, e.g. food security, possibly leading to a better quality of life, be it through higher levels of income, education, health and food conditions (cf. Therborn 1995).

**RESEARCH QUESTION: COMMUNITY VIABILITY AND SOCIO-ECONOMIC CHANGE**

These emerging changes and their challenges are the focus of this paper, which brings together results from various projects that focused on formal and informal aspects of socio-economic development, well-being, food security and cultural contact on regional and local levels in the Barents Euro-arctic Region (cf. Müller-Wille 1998). Besides the prevalent forces of the economic markets, environmental, cultural and linguistic aspects of the human condition in northern regions were considered crucial elements in these studies. The underlying principal research questions were as follows.

- How do small northern communities and their residents manage to function culturally, socio-economically and politically in their own regions through internal and external relations and structures?

- How do these communities either react to, refute, or integrate external forces and pressures of any type into their societies and regions causing socio-economic, cultural and political change and adaptation?

The individual case studies were conducted mainly at the community level in northern Finland, and were designed to complement each other in their scope and approach. In this way, the studies aimed at a comprehensive understanding of the potential and opportunities local communities have in their own familiar environments, despite increasing external pressures. The case studies were carried in northernmost Finland within the Province of Lapland and, partly, within Sápmi, the Sámi Home Region. The first two studies concern social and cultural aspects of local conditions, drawing from general statistics to explore indicators of change and from personal interviews delving into the intricate social and economic relations between Sámi and Finns in a situation of cultural contact. The next three studies centered on the political and environmental issues related to modern Sámi reindeer herding, the conditions for local food security in a small Finnish reindeer herding community outside the Sámi Home Region, and the interface between reindeer herding and other
land-use practices including protected areas. These studies are discussed in the context of 'well-being', interethnic relations, sustainability and community viability, using reindeer herding to illustrate emerging changes, which are presented in the concluding synthesis.

**SOCIO-ECONOMIC WELL-BEING IN SÁPMI—FINLAND'S SÁMI HOME REGION**

The aim of this section is to present a well-founded interpretation of the current conditions for socio-economic development and well-being in the Sámi Home Region (SHR) to set the stage for a discussion of the related issue of cultural contact and food security addressed in the sections that follow. By focusing on a specific region with rich cultural traditions based on local resource use and shaped by developments during the post-modern phase of Nordic societies, the work can be applied to current and pressing issues.

Generally speaking, there are no easy ways to measure levels of socio-economic and cultural well-being, because a state of well-being is an expression of complex affairs with seemingly objective factors such as economic prosperity, combined with subjective feelings and attitudes (Allardt 1973; Allardt and Uusitalo 1972). The strategy used in this analysis was to combine various macro-level indicators collected from official statistics with interpretations of socio-economic processes on the national level with materials obtained from research conducted in northern communities (for an earlier discussion in the Finnish context cf. Nurmio 1989, 1991; Tuomi 1989).

**The Sámi Home Region—Sápmi on the Finnish Side**

The Sámi Home Region in Finland comprises the three northernmost municipalities—Enontekiö, Inari and Utsjoki—and the adjacent Vuotso area in northern Sodankylä. The Vuotso area is excluded from the discussion for technical reasons, because statistics are kept by the municipality and specific areas cannot be separated below that level. Population figures for 2002 (1998), without reference to ethnicity, were 2,097 (2,300) inhabitants in Eanopat-Enontekiö, 7,241 (7,555) in Anár-Inari and 1,421 (1,460) in Ohcejohka-Utsjoki, a total for the three municipalities of 10,759 (11,315), representing a decrease of almost 5% in only two years. This confirms a noticeable downward trend in the population in the Province of Lappi since the mid-1990s (Population Register Centre 2002).

The Sámi population in Finland, Sweden, Norway and Russia was estimated to be between 70,000 to 100,000 in the mid-1990s (Markelin 1998). In Finland in the late 1990s, there were about 7,000 Sámi (i.e., North Sámi, Anár-Inari Sámi and Skolt Sámi) registered in the Electoral List of the Sámi Parliament in Finland, of which 4,000 lived in the Sámi Home Region, 2,000 in other parts of Finland and about 1,000 in foreign countries, mainly in Norway and Sweden (Statistics Finland 1999:31). Ohcejohka-Utsjoki is still the only municipality in Finland with a Sámi majority, although recent figures indicate that the Sámi represent just barely 50% of the population, or some 750 residents (Aikio, M.S. 2002). The Sámi, recognized since 1995 by Finland's constitution, and by the European Union as the only aboriginal people in Europe, are thus in the minority (35%) versus the Finnish
majority population (65%) in the Sámi Home Region. These figures only include permanent residents in this region (Statistics Finland 1999).

The permanent Finnish population in the Sámi Home Region also includes, next to more recent immigrants, descendants of both early Finnish agricultural settlers (dating to the 17th century) and aboriginal Sámi. Since the mid-1990s, some of these descendants have voiced their concerns over ethnicity-based claims, i.e., Sámi rights to land and resource utilization in this region. They have addressed claims to Sámi ethnicity and rights based on biological descendence. This situation provides insight into some of the unresolved issues of ethnicity and the identification of people with ethnic groups and boundaries discussed by Barth (1969). The reality in the communities, is that there does not seem to exist any confusion over ethnic affiliation, since belonging to one or the other 'group' is a given in contact situations (Aikio, M. S. 2002 on Sámi; cf. also discussion by Ruotsala 2002: 373ff. on Finnish reindeer herders, Grönfors 1999 on the Rom, and Westerholm 1999 on the Finland Swedes).

**Dimensions of Regional Well-Being**

It is crucial in socio-economic analysis to distinguish between 'being well' and having preconditions to reach an acceptable level of well-being. The former is the main focus here, even if much more attention is paid currently to the latter in debates over developing regions, their networks, and social capital. In order to reach levels of well-being a region's population has to have a solid knowledge base and networks by which knowledge is obtained and applied to local situations. Furthermore, the population needs to understand and take advantage of opportunities to develop the region's potential. One major issue in these debates concerns the role of social capital (cf. Therborn 1995, Maskell 2000). Finally, the adaptation of suitable technologies is of paramount importance to reach and sustain appropriate levels of well-being.

Socio-economic analysis must begin with a definition of perceived levels of well-being. The heuristic guideline was applied for the survey on living conditions in Nordic countries conducted by Erik Allardt (1975) in the early 1970s, in which Allardt conceptualized 'well-being' as 'having, loving, and being.' The reason these concepts were developed was the need to operationalize values. Why then, one could ask, is this needed at all? Allardt started with the age-old argument that the operationalization of welfare conditions is ‘usually based on measurements of the standard of living; the standard of living means a person’s actual living conditions relative to their needs. The difficulty lies in determining a person’s ‘needs’ (Allardt 1975:10).

What emerges from classical sociological analyses is that ‘needs are socially defined [which] also implies that they, or rather certain states of satisfaction of needs, reflect values,’ and that ‘in order to make values applicable on a practical level, they have to be operationalized; that is, procedures have to be found to measure and assess the values’ (Allardt 1975:10-11).

In his seminal work on Nordic societies, Allardt (1975) defines these concepts in the following way.

- 'Having' relates to individual resources and, with some qualifications, to physical need; as such, it is strongly related to income and employment, as well as health and physical well-being.
'Loving' is the crucial way in which a person is related to other individuals and to the group she/he cares for. Thus, a person is socially anchored and not without social roots. Satisfaction then derives from the value given to 'loving' as opposed to anomie. To operationalize 'loving' presents difficulties but, according to Allardt, to obtain insights into people's thinking, this problem can be approached through intensive and detailed personal interviews. The same is valid, in our opinion, for various other field research strategies as well.

'Being' as a value is related to the concept of personal growth, its levels of satisfaction and self-actualization (which is opposite to alienation). To measure this dimension, one must ask what a person represents in her/his relation with others in society. To be irreplaceable or to have no substitution is an attribute of self-actualization. According to Allardt education might indicate such a condition. On the other hand, practical knowledge may have similar effects, for example, a professional reindeer herder might be as irreplaceable in the local community as a professor of sociology in academic circles (Allardt 1975: 12 and 15).

These three concepts are applied using limited statistical indicators that can still be meaningful for interpretation at the local community level, i.e., the municipality in Finland.

Statistical Indicators of Well-Being in the Sámi Home Region

In the following paragraphs, indicators of macro-level socio-economic well-being in the Sami Home Region are presented and discussed. These indicators do not include subjective evaluations by individuals about their well-being; they are based on statistical data easily obtained from Statistics Finland's databanks at the municipal level.

'Having': The gross national product (GNP) provides a general measure of the level of material wealth in a region. For the Sámi population, land ownership and control over and distribution of local resources are extremely important issues that includes reindeer herding (capital on hoof), land use practices, and rights to other local natural resources. Consequently, such issues as rights to herd, fish and hunt have an impact on food supply and security for the local population that maintains extensive knowledge of the surrounding environment.

The GNP is established and recognized as an objective indicator of the material standard of living and wealth and is generally quite useful regardless of its disadvantages for detailed micro-analysis. The GNP index figures used in this study are for one 10-year period (the 1990s), for the three municipalities and are compared with the rest of the province and Finland (with Finland as the reference index at a value of 100) (Table 1). The indications are that the Province of Lappi is ‘a poorer province’ than the rest of the country and, furthermore, the Sámi Home Region is even ‘poorer’ than Lappi.

The regional differences are clearly noticeable in the labor market. Employment statistics are based on registers kept by the Ministry of Labor for each
municipality. There is a substantial problem with these statistics in terms of grey economy which is not easy to capture in figures. The growth of the grey economy nationally, on the one hand, and substantial work being done in reindeer herding, fishing, and berry picking, on the other, are an important contribution to the family's own consumption and to the job market during formal unemployment periods. In addition, the cross-border opportunities offered by the Norwegian labor market is a further pull in northernmost Finland since Norway has and continues to experience a lack of labor force in its northern regions because of the oil boom since the 1990s (Bröms et al. 1994).

Leaving any speculation based on these figures aside, one can remark that Ohcejohka-Utsjoki (with a very small Sámi majority) has the lowest unemployment rate among the three municipalities, but even there the percentage of unemployed in the work force has been continuously quite high. During each year of the 1990s, Eanopat-Enontekiö experienced structural unemployment of over 30 percent. In reindeer herding, work periods are limited to specific seasons and herders are often unemployed at various times throughout the year. Although local residents were concerned that 'these are people for whom the employment authorities cannot do anything,' the local unemployment offices realized the problem and have been able to pay unemployed reindeer herders benefits despite seasonal changes (cf. Heikkinen 2002).

'Loving': This dimension of well-being is extremely difficult to operationalize in terms of an objective measurement. The original framework developed by Allardt referred to positive social relations under the category 'loving'. Indicators used were levels of social relations in the neighborhood, local community, family unit and friendship. Indicators of anomie such as criminality, suicide, divorce, family violence and child abuse which are recorded in statistics.

The population of the SHR is characterized by intense culture contact resulting in both cooperation and conflict between two cultures, Sámi and Finn. Both are distinct in their social organization and cultural behavior. The Sámi have traditionally developed and relied on a functioning system of social and economic networks based strongly on kinship and location. Today's Finnish population in the region is strongly connected with the network of the majority population of Finland and shows a strong identification with this overarching framework (cf. Paasi 1996).

Some variations are noticeable, but differences are slight (Table 1); in particular mental disorders (higher), violence (lower), children in public care and divorces (lower).

'Being': The concept of 'being' can be analyzed according to the level of education (measured by special indicators). In the SHR it is, on average, rather high among people in the rural municipalities of Lappi and somewhat higher than average in rural municipalities in the rest of Finland (Statistics Finland 1999:69-71). Even in this case a negative value can be found in the statistics by looking at suicide rates which indicates a low score on the scale of 'being' (Table 1).
**Table 1: Selected indicators of well-being in the Sami Home Region, Lappi and Finland in the 1990s** *(Source: Statistics Finland n.d.)*

<table>
<thead>
<tr>
<th></th>
<th>SHR</th>
<th>Lappi</th>
<th>Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HAVING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>26%</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>- (of work force)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- (yearly average 1990-98)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average income per person (Finnmark-FIM)</td>
<td>72,442</td>
<td>77,682</td>
<td>87,489</td>
</tr>
<tr>
<td>- (state taxation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- (yearly average 1990-99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of persons in overcrowded dwellings</td>
<td>37%</td>
<td>31%</td>
<td>28%</td>
</tr>
<tr>
<td>- (yearly average 1990-99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOVING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of all types of mental disorders</td>
<td>36%</td>
<td>32%</td>
<td>34%</td>
</tr>
<tr>
<td>- (entitled to disability payments)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- (early average 1988-99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion (%) mental disorders (psychosis)</td>
<td>1.3</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>- (of population 1988-99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- (gets compensation for medicine)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murders 1988-99/100,000 persons</td>
<td>2.87</td>
<td>3.83</td>
<td>2.77</td>
</tr>
<tr>
<td>Attempted murders 1988-99/100,000 persons</td>
<td>6.47</td>
<td>8.99</td>
<td>5.69</td>
</tr>
<tr>
<td>Number of children/1,000 taken into public care</td>
<td>4.4</td>
<td>5.9</td>
<td>8.3</td>
</tr>
<tr>
<td>- (age 0-17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- (yearly average 1991-99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorces/1,000 married women 1990-1999</td>
<td>11.7</td>
<td>12.3</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>BEING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of people receiving disability payments per 100 persons in work force 1990-98</td>
<td>12.5</td>
<td>14.5</td>
<td>11.7</td>
</tr>
<tr>
<td>Suicides /10000 persons 1988-99 (crime statistics)</td>
<td>2.73</td>
<td>2.72</td>
<td>2.15</td>
</tr>
</tbody>
</table>

**Notes:** Unemployment: Yearly average. Calculated on employment figures which are based on registers. The percentage of persons in overcrowded housing is calculated by norm 4: >1/room, kitchen excluded, and calculated by a yearly average. The percentage of people with mental disorders is calculated by yearly average, and based on the number of people receiving disability payments. The proportion receiving medical compensation is calculated as total numbers, not yearly averages. The proportion of murders and attempted murders is calculated as the total, not as yearly averages. Murder includes categories: murder, man-slaughter etc. The percentage of the population was calculated against the total population for all years.

At this level the most important conclusion is that although statistics exist, these do not provide a comprehensive picture of the socio-economic situation. Furthermore, because the statistics cannot be broken down according to ethnicity, variations between Sámi and Finns cannot be assessed, except by language, which is a category used in the general census. Therefore the available figures have to be looked at carefully when interpreting living conditions in northern communities having considerable cultural diversity.
CULTURAL ENCOUNTERS BETWEEN SÁMI AND FINNS IN SÁPMI

The focus of this section is on encounters between Finnish (male) tourists and Sámi (males) in Sápmi after World War II. These encounters happen in the context of established ‘guest-host relations’ (in Sámi verddevohta) between Finnish tourists and Sámi. The concept of the verdde relationship has its origins in traditional Sámi guest/host relations, based on social and economic needs and demands within Sámi society itself. Through verdde the Sámi have practiced mutual social and economic exchange systems, based on different resources and livelihoods; there have also been mutual exchange systems between Sámi and non-Sámi groups. Today, the original Sámi verdde has more or less lost its significance with the emergence and processes of modernization, the welfare system, and the influence of modern free-market forces such as tourism. However, some Sámi people still refer to personal tourist contacts and acquaintances using the term verdde.

What then constitutes modern verdde relations in contacts between Finnish tourists and the Sámi in Sápmi if compared with traditional concept? Is it still a mutual and equal exchange relationship? Are there other ways of conceptualizing the encounters between tourists and local Sámi in the Fenno-Scandian north? And why does alcohol seem to play an important role in this relationship?

In answering these questions, it is crucial to understand the social and cultural meanings of these encounters, because the two parties use the same natural resources and spaces within the context of rapidly expanding northern tourism based on sports fishing and hunting, recreation and nature experiences. One can argue that there is continued spatial, political and socio-economic competition between the commercial and subsistence use of natural resources in the circumpolar north in general, and more specifically in northern Fenno-Scandia and thus Sápmi.

The materials used for the analysis of this verdde relation are of two kinds: first, a specific genre in Finnish literature, the widely produced and read travel fiction written by sports hunters and fishers, all Finnish tourists and males, and, second, extensive personal interviews conducted with both local Sámi and Finnish tourists, mainly men, but also some women.

This interpretation of these encounters relies strongly on discourse analysis. The starting point is the presumption that language not only reflects, but also constructs, social reality. Accordingly, the concrete study objects are the discourses through which Finnish tourists and the Sámi interpret their mutual encounters. The term ‘discourse’ refers here to conventional, normally unquestioned ways of thinking, reading and writing concentrated on particular objects. In discourse analysis the user or speaker of the language is not regarded as an informant telling the ‘truth’ and showing her or his ‘real’ attitudes. Instead, the various ways they describe certain phenomena and name them is the research interest (cf. Fairclough 1992).

The social construction of reality (in this case, the encounter between Finnish tourists and Sámi), is explained through the linguistic practice. However, it is more than a linguistic analysis since discourse, since the ways we, for example, define objects, have consequences in social practice.

In analyzing the material, the point of departure is that texts—written or spoken—do not only construct an image of certain objects, they also construct
identities both for the author and the reader. The identities formulated, in turn, direct social practices and legitimize them, thus constructing a social reality. In this case, the ethnic groups and their boundaries are clearly defined (cf. Barth 1969). Who is a Finn and a Sámi is explicitly expressed through the interviews.

Thus what kinds of identities are constructed by the texts for the Sámi on the one hand and for the Finnish tourists on the other, and what kinds of social practices do they construct and convey through their encounters? The analysis of the interviews identified three major discourses for each group concerning their encounters and the construction of each other's identities.

Finnish tourists talked about their relationship with Sápmi and the Sámi as follows.

1. Their ‘Lapland’ is solely available to them alone for sports hunting and fishing;
2. their discourse is full of strong neo-romantic ideals; and
3. they are the extreme users or consumers of the ‘wilderness’ as they perceive them.

Correspondingly, the Sámi ways of speaking in the interviews stressed the following aspects and characteristics.

1. The continuing value of the traditional verđđe institution;
2. the image of the suspicious and/or ambivalent Finnish tourist; and,
3. a new and rising discourse about client relationship in which the tourists are seen as 'clients' and not anymore as 'verđđe'. This is a recent development in which the socio-economic relations are more and more directed by money as the facilitator in the client relationship.

For example, the following represents very well the content of the above mentioned discourses. The discourse of the sports hunters' and fishermen's 'Lapland' is, by its nature a masculine or male-constructed discourse. Occasionally, Finnish tourists present a cultural encounter with Sámi through the narrative of alcohol use. The subject of the narratives is then, usually, a fishing trip to Lapland. In these stories the ‘liquor bottle’ is, in fact, equated with ‘alcohol as bait’ when Finnish fishermen and Sámi men meet at the sites of action, i.e. fishing or hunting. The local Sámi, the ‘host,’ is lured into interaction with the help of alcoholic beverages and, under the influence of alcohol, is induced to reveal his expert knowledge of fishing grounds to the ‘guest.’ In this discourse the Finnish tourist is identified as the 'predator' and the local Sámi as the 'prey.' Obviously, this is not an equal relationship between the host and guest as is understood by the Sámi verđđe institution.

This is just an example of the various ways of describing the encounters. The interviews brought to light the spectrum of cultural structures behind these discourses in a broader and encompassing context, allowing an evaluation of the actual conditions of the encounters and their ensuing consequences. These consequences have resulted and still result in gains for the Finns—access to information and locations—and in loss to the Sámi—surrender of knowledge and control. In this way, the various aspects of such encounters are made intelligible but also reveal and question the possible discourses that produce and maintain uneven
and subjugating relations between Finns and Sámi, particularly within the realm of increased tourism of any kind. Modern tourism is a pervasive encounter across cultural borders that has an enormous impact on aboriginal peoples throughout the circumpolar north and in other areas of the globe.

**REINDEER HERDING: SUSTAINABILITY AND MODERNITY IN THE GLOBAL CONTEXT**

Reindeer herding—its current conditions and predicaments as well as future developments—within the circumpolar north has received particular attention regionally and globally since the 1990s (global circumpolar north: AWRH 2002, Jernsletten and Klokov 2002; and specifically in Finland: Heikkinen 2002, Hukkinen et al. 2002, 2003, Laakso 2002; Finland and Russia: Ruotsala 2002). This attention has emerged as a result of a number of issues and concerns raised about the sustainability and modernity of reindeer herding as a viable economic livelihood based in northern cultural practices within specific ecosystems. Furthermore, 'overgrazing' resulting in the depletion of vegetation cover of reindeer pastures have been identified as threats to environmental integrity and biodiversity. This has triggered external political and administrative decisions to reduce herd size and lower the number of active herders in the Nordic countries. As a reaction to emerging pressures on and threats to reindeer herding and management, herders founded the Association of World Reindeer Herders (WRH) in 1997, representing herders from all regions in the northern circumpolar world. This international organization promotes a 'circumpolar model' for reindeer management that will take into account regional variations and cultural diversity (Turi 2002).

The next section focuses on specific situations in Sámi and Finnish reindeer herding in northernmost Finland (Aikio, P. 2002; Särkelä 2002). In Finland, the reindeer herding area which stretches from 64°30 to 70° N is divided into 57 districts. In 2002, most of the 5,682 reindeer owners (185,731 reindeer) in these districts were Finns, except those within the Sámi Home Region, featuring 13 districts and close to 1,351 owners (24,592 animals), where most herders were Sámi and a certain number of Finns in some districts (Poromies 2002:18).

**Sámi Reindeer Herding: Environmental Management and Food Security**

The concept of food security is associated with the historical development and gradual expansion of environmentalist ideas and practices in the Western world. Sustainable development of the ecosystem is the key concept summing up the environmentalist epoch. Primarily a natural-science based paradigm, the environmentalist discourse is now vigorously extending its scope to the human dimension. Food security, as a theoretical framework, is one example of the interdependence of ecological development and human society; the concept emphasized particular connections. It has to be considered holistically, whereby the context links the actual surroundings and living spheres of the people involved.

In the case of reindeer herding societies, food security is essentially bound to principles and practices of local land use and natural resource management (cf. Beach 1981; Ingold 1981; Paine 1994). Sámi reindeer herding is typically a highly space-intensive means of livelihood with a vast pastoral range and extensive migration routes. The Sámi way of life has traditionally consisted of a multi-faceted
economy in which the emphasis on herding, fishing, hunting and gathering have varied by seasons depending on natural conditions and social circumstances (Kalstad 1997).

There are two factors, in particular, that have radically affected pastoral patterns of reindeer herding in northern Fennoscandia and, in particular, in northernmost Finland over the last centuries (Heikkilä 2003).

1. Population growth due to immigration from the south and internal demographic shifts among Sámi moving from one country to the other; and;

2. Unilateral closing of the Finnish national borders with Norway and Sweden by the then ruling Czarist Russian regime in 1852 and 1889.

These factors have challenged the characteristically flexible, adaptive and innovative Sámi way of life which had been successfully developed to the prevailing environmental conditions. Yet resilience of the Sámi herding communities was not really challenged seriously until the Second World War. That is to say, problems and disputes over land use were not unknown in earlier times. On the contrary, historical documents provide plenty of evidence of lawsuits in these areas. However, Sámi people, as members of Sámi village communities called ‘siida,’ had the legal right to defend their land use rights before the courts under Swedish rule until 1809 when Russia became the colonial power in Finland.

During the 20th century, and mainly after the 1940s, modernization of Finnish society has reached Sápmi and Sámi communities in large measure since then, the choices in adaptation for the Sámi have decreased remarkably. An expanding modern agricultural colonization and infrastructure, changing means of livelihoods and modern ways of living have caused an excessive pressure on the same land areas where reindeer once grazed freely. Even now, no calculation has been made of how many square kilometers of land have been lost to reindeer herding in Finland by the construction of roads, settlement areas, hydro-electric developments, artificial lakes and power-lines, mines and tourist facilities and resorts.

Reindeer and their herders have to compete for diminished so-called ‘wilderness’ areas with other local inhabitants who also use local resources for household income or as a hobby, growing tourist activities and economic interests of the national Finnish Forest and Park Service in commercial forestry (Heikkilä 2000). The latter is actively engaged in land use and natural resource management planning today. In modern environmental management, the aim is to reconcile the needs of local land users with national and international commercial interests and with ideologies and pressures of global environmental movements. Recently, a participatory approach has been introduced into the management planning process to alleviate existing conflicts among the various parties.

Environmental management is vitally important to reindeer herders and their livelihood since the anticipated results will directly influence immediate living conditions. This is accentuated in the context of scarce land resources. Because reindeer herding is the most important producer of food items in this area, i.e., meat, the
Chapter 9: Community Viability and Socio-Economic Change in the Barents Region

results of environmental management policies necessarily include reference to the assurance of local food resources and, thus, their security.

In the discourse on how modern environmental management should be conducted, it is actually competition over the right to define the reality which drives the agenda. In a social constructionist approach, reality is socially formulated and expressed. Information is acquired, comprehension attained, and ideas of the material world conveyed using concepts that are socially constructed. Signifying practice takes place in the language. Reality is always presented as a particular kind. He who has the power to produce knowledge also maintains the power to define how reality is produced, how situations are perceived and how the various actors are represented? Meanings are produced through a system of representation within certain discourses. Discourses are vitally connected to the actual, material living conditions. Discourses have actual effects and consequences.

In modern environmental management in northern Finland, the Forest and Park Service dominates the public discourse. It is they who define preconceptions of planning, the fringe conditions for action, and the character and proportion of actors. The discourse of Sámi reindeer herders remains frequently at the margin because they are a minority in the local society, converging the point of departure, preconceptions and different cultural communication patterns. The principle of multiple land use, propagated by the Forest and Park Service, tends to favor the interests of the majority, the State; whereas less attention is paid to the special needs of minorities.

The local planning process channeled by the Forest and Park Service exercises power by using the right to represent reindeer herding in the management plans. As recent examples show, reindeer herding is represented as ecologically unsustainable, and the reliability and the sense of responsibility of the reindeer herders are questioned. The management discourse is converging with the discourse and argumentation used by scientific reindeer research and the national reindeer herding association in Finland, both strongly supportive of development policies and their implementation. Reindeer herding seems to be a curiosity, a relic—a mix of traditional cultural remnants and an unprofitable business undertaking—in this modern society.

The reindeer herders' arguments, however, are that if reindeer herding needs to reach ecological sustainability, appropriate physical conditions should be granted so that natural checks and balances can function. As a consequence, reindeer herding should be recognized as a primary land use activity in Sápmi. It must be given more authority and self-determination. More credit needs to be afforded reindeer herders' standpoints on modern environmental management. On the other hand, some limitations on land use types and the quantity of users need also be considered.

In spite of modernization, reindeer herding still is the material and spiritual basis of Sámi culture in this region, and the keystone issue of local food security. Only by providing sound and appropriate facilities to reindeer herding is the continuation of the Sámi culture and the tradition of local food security possible.

Household Food Security in a Finnish Reindeer Herding Community

In August and September 2000 fieldwork was conducted in a village, called for the purposes of this discussion Kylä, located in the municipality of Savukoski in the eastern part of the Province of Lappi. Kylä is a typical Finnish rural village of its
Kylä lies in the boreal forest north of the Arctic Circle, and is connected by road to the rest of Lappi. Reindeer herding, fishing, forestry, berry picking, temporary or permanent wage employment, unemployment benefit or pensions are the sources of income for villagers. The inhabitants are descendants of both Sámi and Finns who have lived in this region for generations whose traditions and heritage are fully expressed in the community with Finnish as the sole language spoken.

Villagers had invited the research project to their community to look into aspects of food security. The village association, an unofficial voluntary organization, helped in arranging access to the community and to individuals for intense interview sessions. In 2000, the village had 80 inhabitants in 28 permanent households of which 24 were interviewed; one household refused and the remaining three could not be contacted. Interviews were based on a questionnaire, but often continued informally. With respect to food items, there were large differences in availability and use of different products seasonally or in different years. Fish is used more during summer and autumn, and meat during winter and spring, even though every household preserves fish, meat and berries in a freezer for the rest of the year.

The main questions concerning aspects of food security were: What kind of food resource is locally available; which local foods do people use for their household needs and which do they sell unprocessed or processed; what kind of imported store-bought food is used; and, how is the food they eat prepared?

For the villagers, local food is that which can be produced or extracted locally, such as meat, fish, potatoes and berries. Meat is mainly reindeer meat, which is used by every household no matter whether they own reindeer or not. Hunting moose, rabbits, fowl and waterfowl is not as important because of the low number of wild animals available. Fish is the second most important food product for villagers, and in some families even the most important. People fish with rods, nets and seines in rivers and lakes.

Wild berries, such as cloudberry, blueberry and lingonberry, are also used by every household. Every family has a garden where they grow potatoes, strawberries and black currants. Onions and root crops also grow locally, but not every family has them in their garden plots. Some local resources are not used on a large scale, like mushrooms and herbs. Dairy farming is also possible; however, there is only one active dairy farm left in the village. This farming family uses milk as a local resource, but others buy milk and dairy products from the nearest store as imported food. Until the 1960s dairy farming was a common livelihood in the village.

Reindeer meat is used for home consumption, however, it is mainly sold to external markets on a large scale; this is also the case for wild berries. Reindeer meat and fish are also sold within the village or the municipality. Local exchange or sharing of food items such as reindeer meat, fish, berries and potatoes is very rare, and happens mostly within families between younger and older generations. One can also barter for some services, such as rent for hayfields or snow removal with food such as meat and fish. Meat, fish, potatoes and berries form the basis of nutritional requirements, however, some store-bought food is also a significant part of the diet, namely dairy products and bread. Milk is a common beverage and rye is the most popular bread. Most families consider home-made barley bread to be local food, even though barley is no longer grown in the village. Most villagers bake barley bread and the popular Finnish coffee sweet bread at home.
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Generally, people do not buy much pre-cooked or processed food. Grain products are used widely; for example, oatmeal is very popular. People use large quantities of margarine, butter and coffee. Villagers do not buy meat products from the store, except sausages and cold cuts. Vegetables are not popular, although cucumber and tomatoes are used almost in every household. Fruits are used on a very small scale, mostly during winter.

The lack of a store in the village does not cause problems because most villagers have a car and they often travel to the municipality center. A mobile store from an adjacent village delivers food products to the village's households twice a week. Still for the villagers in all households ‘real food’ is reindeer meat, fish, potatoes and bread and the most preferred dish is reindeer meat soup. This clearly expresses the continued reliance on ‘country food,’ i.e., food obtained from local renewable resources. Therefore, continued access to these resources, in particular reindeer, is of paramount importance for the food security of such small rural communities still spread out over the wide expanses of the Province of Lappi. It is the geographic closeness to the resource that guarantees continued use; modern amenities and services still seem to be in limited availability in such communities.

Reindeer Herding, Institutions and Multiple Land Use Practices

The themes discussed in the previous sections closely relate to another multi-faceted study focused on the modernity of reindeer herding management supported by the European Union and conducted in northernmost Europe, the so-called RENMAN project. These projects have run concurrently. Therefore attention is drawn to some of the first results that both projects have attained by working closely with reindeer herders as partners in research. Through interviews and a series of workshops (Hukkinen et al. 2002, 2003) based on the principles of participatory action research, reindeer herders from several reindeer herding districts have identified a number of problematic areas crucial for the development and successful continuation of reindeer herding: access to land (space) and resources (animals) and securing employment (livelihood) and food (meat). Having identified these problematic areas, reindeer herders in Finland—both Finns and Sámi—understand that their livelihood is but one small activity in the larger context of socio-economic development and changing and competing land use practices in the circumpolar north. However, the issue is the continuation of locally based and well-adapted livelihoods in specific natural environment versus the increasing interests of other land uses which clearly have created spatial and managerial constraints for reindeer herding.

It is also understood that there exist considerable conflicts and disagreements between reindeer herders and other users of the same land or space, i.e., farmers, entrepreneurs, industries, public authorities, tourists and others. The situation is complex along socio-economic, political and, last but not least, cultural lines. Conflict resolution is difficult to achieve particularly if, in most cases, the stakeholders do not recognize each other in order to be able to negotiate a constructive compromise.

Areas of concern for reindeer herders can be summarized by key statements formulated by the reindeer herders themselves (Hukkinen et al. 2003). They clearly express frustration and helplessness in a world that has become very complex from the local to global and vice-versa.
1. Necessary reflections on the role of (aboriginal and national) societies in the resolution of problems in reindeer herding.

2. Solutions to the conflicting demands between market economy and individual and community livelihood supported by cultural expressions (social relations, language).

3. Solutions for the conflicts and challenges in the relationship with other land use interests and practices.

4. Clarification on what is the optimal number of reindeer herded in relation to pasture conditions and capacity.

5. The question of subsidies and compensations for reindeer herders and herding measured and evaluated against subsidies and privileges given by public governments to other economic activities such as agriculture or tourism.

6. The establishment of an appropriate administrative and management regime for reindeer herding, either centralized or localized power.

7. The impact of umbrella institutions such as the European Union establishing and enforcing specific requirements, e.g. slaughterhouses and other directives influencing reindeer herding today.

8. Questioning the role of external research (science) versus local expertise (knowledge) in planning for the continued future of reindeer herding.

One particular example is this interface between local reindeer herding and protected areas established by the central state is rooted in conservation and environmental protection policies. A specific case is the spatial and socio-economic relationship between nature conservation (e.g., the Urho Kekkonen National Park, established in northeastern Finland in 1983), and existing local land use practices such as reindeer herding. Here the analysis focuses on management practices by both parties and their success in alleviating conflicts derived from different philosophies, approaches, practices, and goals. The ultimate issue is whether these interests can co-exist in the same space and, how, in particular, the continuation of reindeer herding can be assured to contribute to the food security of local communities.
INTERETHNIC RELATIONS, COMMUNITY VIABILITY AND REINDEER HERDING

The directions of socio-economic development and the level of well-being in northernmost Europe and in particular in Sápmi hinge on a number of factors, situations and circumstances (cf. Andersen and Poppel 2002). Current research points to three specific areas that seem to need considerable attention on the local and interregional scales in the future.

1. Conflict resolutions in interethnic relations within a multicultural and multinational setting.

2. Social and cultural capacity and viability of small communities.

3. Continuation of locally based resource utilization, i.e., reindeer herding and its related livelihoods.

All fall under the umbrella of external influences driven by industrial, commercial and political interests of globalization connecting the very local level with the global dimension in a multilateral way. These influences touch upon land rights, political control and general human and minority rights. In all three areas, discourses on future development express concerns that need to be negotiated resulting, usually, in compromises over who decides what for whom under what circumstance and premises.

In the first area, i.e., interethic relations on the one hand, aboriginal Sámi have experienced, a continuing erosion of their cultural base, language and knowledge; however, on the other hand, there is increased legal protection of their culture that has far reaching global implications under international conventions and national laws and constitutions whose practical usefulness to the local level is often debated and questioned. It is apparent from the studies that conflicts continue to exist on various levels which are connected by complex linkages. Still today, there is a feeling that racial and cultural prejudices are rampant albeit disguised because existing laws do not condone their public expression. In that respect, it seems that few inroads have been made in education, public life and media discourse. Minorities or aboriginal peoples must constantly argue against the majority for their rights, identity, culture and language—a never-ending exposure to stress for the individual and the community at large.

The second area—capacity and viability of local communities—is a challenge not only to the communities that are often at the brink of loosing their specific characteristics and distinctness, but also to central states and regional administrations faced with the need and demand for equal access to all required services and subventions. Quite often such actions are also based on claims to continued and even expanded sovereignty by central state powers. The rapid centralization of inhabitants in ever fewer settlements and regions will leave large areas in the north empty of people, without permanent residents as the keepers of the land, the environment. In this respect it is crucial that human societies continue to live in these regions, expressing their strong relationship with the land and resources, and managed in a manner that will support their own capacity and viability.
The third area, resource utilization, i.e., reindeer herding, is a specific case which has received increased attention recently because of its precarious status with respect to available resources, i.e., space (pasturage), and of its questioned suitability as a viable industry, economy or livelihood in the modern age of rapid change. Despite the recognition that reindeer herding is an indispensable source for food, modern state societies with their administrative and political apparatus have a very difficult time understanding thought patterns that are not linked to profit and expansion, but rather on maintaining the resource and its utilization as an expression of cultural and socio-economic value. It is fully understood by herders themselves that contemporary reindeer herding in the global context is a minute industry with a small output in monetary value (Turi 2002:71-73). This also holds true under highly developed and modern conditions in the Nordic countries.

In the juxtaposition of reindeer herding and other invasive land use practices, the issues center on competition over space, which has led to a decrease of pasture lands for reindeer and limitations for herders' management strategies. The result is the compartmentalization of space for multiple purpose use. The question is whether these land use practices can co-exist next to each other or within the same space, realizing that the natural requirements are for the survival of a species such as reindeer, which is endogenous to the region. A preliminary answer is that efforts are underway to alleviate the spatial and managerial problems, however, solutions that assure the viable continuation of reindeer herding are difficult to attain.

At the start of the third millennium it would seem that ongoing processes are headed for a breaking point, at least in Finland, Norway and Sweden, at which time decisions will have to be made that will directly influence the survival of reindeer herding. Herders themselves see these developments and changes clearly and are preparing their arguments with research that focuses on their own situation. It is here that research can make a difference and a contribution to conflict resolution and avoidance.

REFERENCES

Chapter 9: Community Viability and Socio-Economic Change in the Barents Region


Chapter Ten

People and Birch: The Sámi Perception of the Environment and Its Sustainability¹

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INTRODUCTION

Since the last deglaciation human populations have lived in the northern fringes of Europe (European Commission 1995), intensively using the resources of the arctic and subarctic terrestrial ecosystems. In particular, the forest ecosystem of northernmost Europe and its North Atlantic coastal rim has allowed a range of human adaptations to this specific environment. The mountain birch (*Betula pubescens ssp. czerepanovii*) is the dominant tree species in this ecotone, which covers large areas that have been used and occupied by both human and animal populations over long periods of time. The birch forest represents a unique plant association in the world, where biodiversity and cultural diversity are today threatened and endangered. The viability and sustainability of this region, in both natural and human terms, need to be enhanced under the guidelines issued in the global AGENDA 21 (United Nations 1992).

Birch is one tree species that may take advantage of expected climate warming and expand its distribution against other species, such as Norway spruce. Birch is therefore expected to continue to be an important species for the future economic development in Sápmi and other regions of northernmost Europe. Changing environmental conditions and altered land use patterns (competition among reindeer herding, agriculture, extraction industries and activities such as outdoor recreation and mass tourism) will need attention. The formulation of development and management plans for future sustainability is of paramount importance to the Sámi and all other local residents in these northern tiers of Europe.


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Local populations, the aboriginal Sámi, immigrant Scandinavian and Finnish settlers, have utilized the birch forests intensively over long periods of time for specific purposes through hunting, fishing, gathering, herding, agriculture, forestry, production of goods, and finally recreation (Aikio 1978; 1993; Itkonen 1948; NOU 1994; Paine 1994). Furthermore, forests, in particular those dominated by birch, hold intrinsic cultural and spiritual values that are inherent elements of northern peoples' quality of life (Vilkka 1995). Moreover, in view of the value of birch forest resources in the context of the European Union and its northern fringe, well-defined scenarios for rural development and management plans are necessary in order to enable the evaluation of production potential and yield of this resource for the benefit of local populations (Müller-Wille 1999; Müller-Wille and Hukkinen 1999).

ENVIRONMENT AND SUSTAINABILITY FROM THE SÁMI PERSPECTIVE

Today, around the world, indigenous peoples' systems of knowledge are threatened because they have often been perceived as inferior. It is known that indigenous peoples have had their own experiences in protecting and managing nature (Büchi et al. 1997). The World Commission on Environment and Development clearly stated that many such peoples, who live in isolated areas, have preserved an inherited mode of living in close interaction with their natural surroundings (World Commission 1987:91-92). They have survived because they have understood and adapted to their environment; however, isolation also has meant that these peoples have not always taken part in modern economic and social development. In many cases, they reside in areas with an abundance of natural resources that have attracted external interests for their exploitation; this often tears up local human environmental interactions, thus endangering inherited modes of life. Externally imposed legal and institutional changes that follow in the wake of organized development increase the strain on people and environment alike (Eikjok 1989, 1998).

The Sámi are recognized as an indigenous people within several modern states and, as such, they are part of the Fourth World. Historically, the fundamental cause of the repression of indigenous peoples lies in European/Western philosophy that separates ‘nature’ and ‘culture.’ Here ‘nature’ has a lower status than ‘culture.’ By the very fact that ‘culture’ is perceived as superior to ‘nature’ it is legitimate to repress and control ‘nature.’ In this philosophy, civilization is the culmination of ‘man's triumph’ over nature. This involves a perception that evolution is linear and progressive from ‘nature’ to ‘culture.’ In turn, ‘culture’ thus becomes associated with power and control. In this Western context, men have reserved this power for themselves. But ‘nature’ includes women and ‘primitive peoples.’ That is the very reason why women and indigenous peoples have been defined as less significant people. This attitude has been pervasive in policies and administration of central states towards them during the last several centuries.

The colonization of the Sámi homeland, Sápmi, resulted in severe exploitation and destruction of both the natural and cultural environments (Eikjok 1999). Before these events, the Sámi had a long history of human environmental interactions. Their land was rich in all types of resources and people sustained themselves through the harvesting of natural products. The results from over-exploitation of specific
resources by colonial powers included the extinction of numerous species of animals. The Sámi had their own socio-economic system called ‘siida’ based on local groups who utilized designated areas. ‘Suobbar’ was their political institution dealing with disputes over and allocations of land use rights. This system was disregarded by the colonial powers that defined it as uncivilized since Sámi were generally seen as being inferior and incompetent to run their own affairs. This attitude was effectively established during the 18th century and has not essentially changed until today.

**SÁMI KNOWLEDGE OF NATURE**

The knowledge of the natural environment is collectively based empirical knowledge, embodying experience and skills acquired over many generations of human environmental interaction within a specific ecosystem. Sámi perceptions of the environment are different from European/Western understanding, since ‘luondu’ (Sámi for ‘nature’) is elevated above human social life (Eikjok 1991, 1992). People are part of ‘luondu.’ Processes in the human body and life are structured by concepts that are synonymous with the ones used for natural processes. The Sámi languages have a rich and detailed vocabulary for ‘luondu’ with regards to people, living nature and physical landscape. This situation reflects a profound understanding of human adaptation to nature.

In this traditional universe of understanding, nature is perceived as animated. The forces and essence of nature have the same expression as the human soul. In contemporary Sámi philosophy there are still remnants of the idea that humankind is part of the cosmos. Here a unity exists between spirit and body, expressed through the concept of ‘heagga’ (Sámi for ‘spirit, life’). Thus it is clear that Sámi do not separate nature and culture; ‘luondu’ is an innate quality in everything that is alive, something that you are born with. One can influence its development, but it is perceived as having its own existence that must be respected.

The intimate relationship between human life and living nature has functioned as a source of knowledge for the Sámi. In the Sámi ‘Weltbild’ nature is not perceived as being separate from humankind or as an object. Human evolution has been measured in terms of its ability to follow the rhythms of nature intellectually, emotionally and spiritually, bearing witness to a deep ecological understanding.

**SÁMI IN THE BIRCH FOREST ECOSYSTEM: CHANGING FORMS OF UTILIZATION**

Sápmi’s vegetation cover is pervasively characterized by the variation of birch species that have shaped and influenced land use patterns throughout the region. For the Sámi the fundamental concept of birch is ‘soahki,’ with an intricate vocabulary related to natural phenomena such as physical conditions, shape and location. The Sámi have used birch in many different ways; for tools and implements as well as fuel, construction materials and nourishment (bark, leaves, and sap). The birch has been omnipresent in the empirical and spiritual life of the Sámi; however, its position in the local livelihood has been shifting over time, influenced by both
climatic change and economic development during the 20th century towards the 21st century.

The Sámi have utilized the birch forest and the fell with birch copses more or less extensively for centuries. In the vicinity of settlements the meadow birch forests were often cleared for agricultural fields (hay-dairy farming); more distant areas were heavily used as open range for cattle. After World War II an increase in settlement density was encouraged by administrative policies and subsidies. Isolated Sámi outposts were gradually abandoned because of better transportation and accessibility, compulsory schooling and social services.

Until electric power grids were fully established, tall-standing meadow forests were often decimated for firewood in the close environs of larger settlements (between 300 and 1000 inhabitants). This forest type grows predominantly in lowlands with high water table levels. Among other factors, efforts to drain these areas and thus lower the water table impeded the regeneration of these forests. Roads were built at higher altitude in the transition zone from the Empetrum heath forest to the lichen heath forest. These roads were mainly major highways at higher altitude where snow drifting and accumulation were less than in valleys and lowlands during the winter. Furthermore, the road network was extended to industrial sites (mines) located away from settlement areas.

The zone along the forest or tree line is the preferred area for Sámi reindeer migrations in spring and winter. Increased concentration of migration routes for smaller and larger herds had a detrimental impact on the dwarf shrub and lichen vegetation, particularly close to settlements. The depletion of the vegetation cover enhanced damage by erosion. This resulted in vegetation changes (Thannheiser 1975, 1977). In particular, Cladonia species disappeared rapidly since their regrowth requires decades. The intensive overgrazing encouraged negative succession stages with Cetraria species. The tree line retreated due to anthropo-zoogenic influences. During the period of snow cover the exposed birch copses close to the tree line are depleted by reindeer herders for firewood. During the summer months the impact of the extensive need for firewood could be noticed by the tall and chopped-off stumps marling the level of snow cover during the previous season.

Contemporary Utilization—At the End of the 20th Century

During the last decades, the birch forest has changed in its physiognomy and vegetation composition. These changes are particularly noticeable save at lower altitude in lowlands with meadow forest and in lichen heath forests at the forest line. A result of the abandonment of agricultural activities, the first succession phase of grasses and shrubs in fallow fields led to the transition to meadow forests. Rapid expansion of settlements and infrastructure has had additional detrimental impact. The lowering of the water table for cultivation and drinking water supplies interfered with the natural growth of meadow forests.

Until today, only secondary stages have been re-established. The birch forest core, characterized by Myrtillus heath forest and Empetrum heath forest, suffered the least under anthropo-zoogenic influences. This was also augmented by a considerable reduction in the demand for firewood. On the other hand, damages of a linear type, such as foot trails and tracks for vehicles, are very noticeable. Damage
caused by reindeer grazing is very seldom detected. More often, the impact from sheep grazing is apparent on the vegetation. Sheep keeping has increased, and small herds of sheep roam close to settlements during the summer months.

The largest influence of anthropo-zoogenic damage is seen in the lichen heath forest and at the tree line. The construction of an extensive fence system to control reindeer movements has not been the only cause of linear damage to the vegetation cover; but, as well, the damage from the extension of the road network and by off-road motor vehicles (tractor, four-wheelers, motor bikes, and snowmobiles) are recognizable in the vegetation. Furthermore, small erosion activities often result in lasting irreparable damage to the soil. Here the deflation basins in the lichen heath forest are extremely apparent. The causes of these large-scale damages are also linked to overgrazing, since larger reindeer herds are kept for too long in fenced areas, thus increasing the pressure on the vegetation cover. In a number of places the tree and forest line has retreated to a considerable extent.

Future Utilization in the 21st Century
It is obvious—the birch forest will experience changes during the next decades. Certain trends are already noticeable. As a positive sign renaturation of fallow areas and regeneration of birch forest types are taking hold. However, damages are increasing more recently. Directives for utilization are needed if unbridled development is not to result in unbridled damages. The goals of sustainable utilization are first priority. Agricultural fields have been reduced considerably in the valley bottoms. Thus, within a short period, grass and shrub vegetation will appear on fallow fields (i.e., former clear-cuts in the birch forest that were utilized by cultivated plants); this is the first stage of renaturation. Indeed, it would be more suitable to achieve the regeneration of former forest types through planned planting programs. For reasons of nature protection, management plans need to be designed to safeguard culturally based biotopes with rare or even endangered plants and animals. The division of grazing areas that was started by erecting fences several decades ago will be continued into the future for economic reasons.

It is foreseeable that the birch forest will be parcelled into lots, completely relinquishing the open range concept. Overgrazing must be avoided at all costs. Already with the disappearance of Cladonia species grazing should be controlled and restricted. Furthermore, there should be fewer animals in the grazing areas to prevent damage from trampling along the fences, to which reindeer are drawn. Particular care should be taken when using motor vehicles for constructing and maintaining fences to reduce damage through erosion along the trails. In this respect, under the vulnerable circumstances of this ecosystem at the forest and tree line, the oscillation of trails should be curtailed by all means, in summer as well as in winter.

The transition zone between forest and fell has been utilized and visited by more and more people during the last years. Next to local residents, tourists have become a permanent appearance almost all year round. Next to recreation (skiing, hiking), nature observation or sports including adventure tourism (e.g., biking, climbing, rafting) tourists also engage in economic activities important to the local communities (fishing, berry picking). There is thus growing competition with local
Sámi over space and resources and more specifically over access to and control of the birch forest. During the last few years, a general warming trend—particularly during the winter season—has precipitated an expansion of the forest and tree line. However, one has to stress that the birch forest in northern Fennoscandia exists at the outer limits of the ecumene and of sustainability. This condition is clearly expressed by the paucity of species, but also through the richness in individuals. Natural influences (climatic change) have mainly long-term effects, but anthropo-zoogenic impact can leave behind irreparable damage to the natural and cultural environments in a short time.

**CONCLUSIONS**

The birch forest ecosystem is a vital element to the maintenance of the natural biodiversity in the subarctic and the socio-economic well-being of the Sámi and other local residents in northern Fennoscandia and Sápmi. Changing patterns of utilization of this resource have influenced attitudes towards nature but have also altered the relationship between people and birch. In its modern developments Sámi society has set new goals and priorities to achieve and sustain an appropriate level of socio-economic well-being for all local residents. With respect to the future conditions of the birch forest ecosystem, this requires the identification of specific goals and the related necessary ecological and political measures to secure and enhance the environmental viability of birch within the overall context of human and natural requirements - a task not easily attained.

The subarctic and arctic regions represent delicate ecosystems whose conditions are susceptible to change caused by both natural processes and human influences of long- and short-term impact. There is a need for the formulation of appropriate management plans that draw from indigenous ecological and cultural knowledge as well as scientific assessment; bringing different analyses together will generate policies whose implementation will enhance the sustainability of the birch forest environment in conjunction with established human conditions.

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RUSSIA
Chapter Eleven

Reindeer Meat, Fish, Potatoes and Bread. Food Security of a Northern Community in the Nenets Autonomous Okrug, NW Russia

Tuula TUISKU

Supplying northern areas, and ensuring the availability of local resources, is an issue of importance throughout the Circumpolar North. The question of food security in the northern areas of the Russian Federation has been an international concern since the collapse of the Soviet Union.

This paper discusses the state of food security at the household level in a rural community of the Nenets Autonomous Okrug in North-West Russia. It addresses access to and availability of local food resources and some imported products. The discussion is based on an examination of the social system, food circulation patterns, and consumption of available and accessible food resources.

ENVIRONMENT AND HISTORY

The Nenets Autonomous Okrug area is located primarily in the tundra vegetation zone; however, there are also forest tundra and fertile meadows on river valleys. The population is 41,500 people in an area of 176,700 km² (0.23 km²), but almost two thirds of the population live in the city of Naryan-Mar (and the neighbouring village of Iskatelei). The Nenets form an indigenous minority (17%), while Russians are in the majority (more than 70%). The Okrug economy has centred on local renewable resource use, mainly fishing and reindeer herding, but in more recent years, the Nenets Okrug is experiencing an oil and gas boom.

This paper is based on a study conducted in 2001-2002 in the village of Krasnoe, located on the Pechora River delta, north of the city of Naryan-Mar. There are about 30 villages in the region with populations varying from less than one hundred to about 1,600. Krasnoe is the largest village in the area with a total population of 1,630 in 394 households (2001), consisting of three ethnic groups: Nenets (indigenous people), forming half of the village population, Russians and Komi. Among the Russians are descendants of early settlers, who moved to the area beginning in the 16th century, and descendants of newcomers, relocated from central Russia to fishing ports in the 1930s and 1940s. The village of Krasnoe was established in the 1950s as a centre for the collective farm, or kolkhoz, Kharp, where the dairy farm and administration were located.

Before collectivization, nomadic Nenets lived on reindeer herding, fishing and hunting; settled Russians on fishing and small-scale dairy farming; and Komi were

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semi-nomadic and combined small-scale agriculture with reindeer herding. Collectivization and sedentarization policies changed the situation so that dairy farming, fishing and herding were now managed by the kolkhoz. With the resulting increase of the village population, the government sector (health care, education and cultural services) also expanded.

Currently, residents pursue a wide range of livelihoods and professions in the village. The largest employer is still the agricultural cooperative Kharp (former kolkhoz), which employs 200-250 people in herding, dairy farming, fishing, power services and gas stations, fur workshops, and administration. The government sector employs 150-160 people in health, education, cultural facilities, and village administration. An organization employing 30 people is responsible for village infrastructure; water wells, saunas, etc. There are six stores that, altogether, engage 20-30 people. There are also a wide range of entrepreneurs; store owners (who employ a few sales persons), fishermen, reindeer herders, and handicraftsmen. Many villagers operate some kind of informal business: e.g., they sell fish or reindeer skin boots on the markets. Some villagers work in oil fields as seasonal workers from October to May, or in two-week shifts. Nonetheless, the village is characterized as a reindeer herding village by outsiders.

The 1990s was, economically, a very unstable time for the Nenets Okrug: production decreased, salaries were not paid on schedule, and there was generally no disposable income. At the same time, a restructuring of local administration, trade and other government and service systems was taking place. The village council became the seat of administration, and the agricultural cooperative lost its position of power as the ‘leader’ of the village. People were struggling every day to survive, and self-sufficiency and a subsistence economy became a necessity. The economic situation has improved in the last few years. The state can pay salaries on schedule thanks to revenues from oil and gas development, and the agricultural sector is providing salaries and payments in cash as well as in product. However, people continue to rely on local food resources.

All households claimed that the core of their diet consists of reindeer meat, fish, potatoes and bread. Butter, sugar, pasta, berries, tea and biscuits were also considered a necessary part of the diet. Dairy products, vegetables and fruit were seen as a luxury, bought when there is disposable income. In Krasnoe, people do not categorize food as wild or country food versus imported food, but as traditional versus modern food. Traditional food refers to ‘what we have always eaten, or what food we ate when we were children,’ which includes both locally produced and imported food.

**TUNDRA FOOD**

The tundra, including its water resources, has provided security for people in the area from time immemorial, and still today it provides the core of the diet: meat and fish, but also berries and mushrooms.

Generally, land and water resources are owned by the Russian Federation, represented by the Administration of the Nenets Autonomous Okrug. The state gives rights to use the land for certain purposes. Reindeer herding enterprises have a right to graze reindeer, but the state can also provide oil and gas companies a right to explore and exploit the land. According to legislation, oil and gas companies must
obtain an agreement from the herding enterprises, which the latter have given. Compensation for land use, which is required by law, is relatively small, but some reindeer herding enterprises have negotiated financial or material compensation for themselves (Tuisku 2002a, b). Even though current legislation would provide a good defence for herders and traditional land users, laws are not always enforced.

Reindeer herding is always a large-scale, professional occupation of a certain group of people, who lead a nomadic way of life despite the ownership structure of the reindeer herd. Currently, there are three forms of ownership: collective herds owned by agricultural cooperatives, former kolkhozes and sovkhozes; personal herds of employees of the cooperatives (collective and personal reindeer are herded together); and private reindeer herds composed of animals belonging to a union of herders or family clans. In Krasnoe, the agricultural cooperative Kharp, and a union of private herders, Erv, have their administration, and houses of herders. Each herding enterprise has access to a certain land area, which is divided into camp routes, and each camp is responsible for 1,000-2,000 reindeer collectively. Reindeer meat is produced for markets, but it is also the staple food both for the herders and the villagers. Moreover, in the tundra, reindeer still provide transport and material for dwellings and clothes.

Fishing can be divided into two types: professional fishing for markets and fishing for subsistence. In Krasnoe, commercial fishing is relatively small-scale. There are a few ‘professionals’ licensed to fish as private fishermen or through Kharp or Erv, but there are those who fish without licence for the Naryan-Mar markets. Fishing and migratory bird hunting for subsistence needs is undertaken by most households.

Subsistence fishing and hunting is controlled by the state. There are regulations regarding the species, the time of the year, and the areas in which fishing can occur—regulations that are not always observed by the villagers. The hunting season for birds is also regulated: in spring time bird hunting is allowed for ten days, the exact time varying from year to year. Each hunter is required to have a hunting license and a license for their gun, but they can hunt anywhere. There are fish inspection and game police, who travel throughout the area to check the legality of fishing and hunting activities. In the past, inspectors did not pay attention to subsistence fishermen, and they were easily bribed by ‘large-scale’ fishermen, but officials are stricter with regard to illegal fishing today. Harvesting of berries and mushrooms is not restricted in any way.

Oil and gas industry activities present the largest threat to the environment. The construction of oil fields, pipelines and roads can reduce grazing areas, and contamination of the tundra by chemicals and oil spills can cause ecological damage. Indeed, most local people are concerned about the degradation of grazing areas, and chemical pollution of land and water threatens biodiversity. There are other factors that have impacts on the environment, and local populations are worried about the future of the tundra. The Pechora River is polluted by adjacent towns and villages, and the tundra has been contaminated as a result of earlier nuclear tests carried out in Novaya Zemlya. The impacts of nuclear testing that occurred from the 1950s to the 1980s on the health of local populations have been discussed in the Russian literature: the incidents of cancer are high among herders from the eastern part of the Nenets Okrug (Aipitsin 1998; Tolkachev 1996), and local doctors argue that
industrial and urban development have caused health problems for local populations (Aipitsin 1998; Isaev and Tkachev 1998).

Because of the nearness of Naryan-Mar, the Pechora delta is overused. City dwellers use the river valley and tundra to fish and hunt. Herders have been victimized by reindeer poaching by town people, who can easily reach the herds in winter by snowmobile. This leads to impacts by another set of social factors, namely economy, social stratification, technology, and demography. The area used by the villagers is very large, requiring various means of transportation; they use snowmobiles in winter and motor boats in summer for fishing. The ability to acquire and maintain snowmobiles and boats is dependent upon their economic situation. For the villagers, there are several sources of income (wage labour, state benefits, and private enterprise) at their disposal. The state sector provides wages regularly, and fairly good wages, while many other enterprises pay irregularly. State benefits are paid on schedule, and are an important source of income. Many households are engaged in small-scale private businesses, such as reindeer skin boot construction and/or selling fish. This leads to increased social stratification among the population.

The size and age structure of a household also has an impact on the capacity to hunt, fish or gather because all these activities require good health. There are households with only senior members who are unable to go out harvesting. There are also single women, who cannot leave their children, buy equipment, or do not have a companion for fishing.

VILLAGE FOOD

Among the exogenous food items which have become part of the local diet, the most important are bread, potatoes, and milk. Bread (first rye and barley, then rye and wheat) was brought by Russians and Komi settlers who imported the flour from southern areas. Even though they were forced to adopt new livelihoods, such as fishing, hunting, and reindeer herding, they continued to raise a few domestic cows. Their contacts with southern areas never ceased; they exported fish and meat and imported flour, which was a necessity for them (Islavin 1847). As a result of these contacts, new items were brought to the area; when the practice of potato farming spread in Russia, they learned to grow potatoes. Being in contact with the Nenets, they introduced new items to the Nenets diet: flour, tea, and butter. Settled Russians and Komi maintained well-developed trading contacts with the nomadic Nenets (Khomich 1970, 1976).

During Soviet times, new items were introduced in the area. Pasta, candies, biscuits, soft drinks, sausages, vegetable oil, rice, canned vegetables and fruits (later fresh) became familiar. Northern areas were supplied fairly well during this time, and in the last decades of the era, people could count on the availability of such basic food items. There was no need to own cows or cultivate potatoes. Potatoes were imported from the Komi Republic, and people could afford to buy them. The dairy farm of the kolkhoz provided milk to the village.

The economic difficulties of the 1990s forced people to begin cultivating potatoes again either in their yard or in a plot provided by the village council. Some households began to raise pigs, goats, and cows; however, difficulties in acquiring feed (hay) caused many households to abandon these activities. Some people also began cultivating tomatoes and cucumbers in their homes or in a greenhouse.
The store-bought food can be categorized as necessities, familiar goods, and luxuries. Bread, butter, tea, and sugar are core necessities. Bread has great symbolical meaning in Russia. It is served at every meal, and a lack of bread in the village or in the tundra is described as a crisis; ‘you need bread with meat,’ people will say. Although there is a bakery in the village, it cannot provide enough bread to meet the needs of the entire population. Thus, some private stores stock bread brought from the city on a daily basis. However, in spring the road can be closed from anywhere from one week to one month. Some families bake bread at home, mostly because they cannot afford to buy it. But, bread is not enough on its own, one also needs butter. ‘We eat bread with butter,’ is understood when things are pretty good: people can afford to buy butter.

Tea with sugar is part of every meal; it is also had throughout the day, when someone visits, or simply as something to drink when thirsty. Tea is served with biscuits and candies, which people consume in large quantities. Pasta products are used a great deal; they can be added to soup or eaten with meat. Onions are the most popular vegetable, most often used raw. Other vegetables, such as tomatoes, cucumbers and cabbage, or fruit, such as apples and oranges, are familiar goods, but a shortage of these is not perceived as a serious problem, ‘we can survive without them,’ as one of the hostesses explained. Luxuries are mostly newer items, such as juice, frozen chicken legs, ready-made food (Russian *pelmeni* or noodle soups), pastry products, and yogurt.

**Circulation of Local Products in the Village**

Circulation can be commercial, or non-commercial, or unofficial. In the village there are four private stores: two that belong to the cooperatives; one owned by a trade cooperative, called a ‘state store’ by the villagers; and the other owned by the agricultural cooperative Kharp. Private stores and the ‘state store’ provide a wide range of products, but the Kharp store stocks only non-perishable food and pastries. The availability of local products in the stores is lacking.

For enterprises, the largest market for meat is Naryan-Mar, either to the meat factory or companies. The distribution of reindeer meat in the village is conducted by individual herders. However, occasionally, Kharp sells meat in its store, and provides meat to its members/workers as a part of their salary. Kharp has a small processing line, which is not used, and Erv is planning to establish a processing factory in the tundra. According to Soviet ideology, local processing was not important, and in the Nenets Okrug reindeer slaughtering and processing was concentrated in Naryan-Mar. The villages did not even have cold storage facilities to preserve meat for the entire year. In the late 1980s, Kharp built a meat freezer in the village, despite the resistance of local officials. It is not imperative that all the meat is sold during the slaughtering season (November-December); it can be sold until late spring at higher prices. The Kharp store also stocks dairy products from the cooperative dairy farm, but most milk is sent to Naryan-Mar, and dairy products are not always available. During winter fishing season, fish are sold in the store. Other stores do not sell local products, but the state store and occasionally private stores also buy berries from the villagers.

Unofficial circulation of reindeer meat is very widely practiced, but fish is circulated only on a very small scale. It is important to remember that herding
families are part of village society, where the family is often an extended family, and a herding family will often have members or close relatives living in the village. These families will receive meat from their relatives in return for services provided (watching over the house, taking care of the children of herders, handling legal and business matters, sewing clothes, or simply letting a herder stay at their home whenever he comes to the village). The herders either bring meat with them when they visit the village, or meat is sent by passing helicopters. If camps are situated close to the village, meat is brought in by sledges or snowmobiles, but if the location of the camp is farther, helicopters or all-terrain vehicles are used. There can be a shortage of meat for some families if there are no passing transports for an extended period of time. Those villagers who are not closely linked to herding families, or engaged in Kharp, have no other option but to buy or barter meat for fish or potatoes, sometimes even for fuel or spare equipment parts.

Fish is circulated to a lesser degree because most households living permanently in the village still fish. As mentioned earlier, herders barter meat for fish because the tundra rivers do not have the same species as the Pechora River, but they fish for food while living in the tundra. However, there are households who do not fish, some because they do not have healthy or male members, others because they ‘are not used to that’ or they do not have the required equipment. Some of them have access to fish from their relatives or barter it for services or meat. Others buy it. Selling in the village is easy: when a fisherman has a good catch, he simply visits those households that have money and sell his fish. Some households would like to eat fish more often, but they do not have the equipment or the money to purchase it.

The circulation of imported products is entirely commercial. Imported foods brought in from the wholesalers in Naryan-Mar are transported by vans and small trucks to the village. Imported products are brought to Naryan-Mar by ships during navigation season and airplanes at other times. Decisions on what products are brought in are made by the wholesalers. The Russian federation supports a special program for supplying northern areas. The transport of flour is subsided by the Federation, but controlled by the administration of the Nenets Okrug, which ensures that flour is supplied to every village. In the Nenets Okrug there has never been a large-scale shortage of flour.

Annual change and seasonality are important aspects of food security, whereby local resources are available only during certain seasons. Even though it is possible to slaughter reindeer throughout the year, the main slaughtering season is in the autumn, when the animals are fattest. During spring and summer, slaughtering reindeer is avoided because of low yield (low weight of the animals), and difficulties of storage. Transporting meat from the tundra to the village is also difficult with no snow cover. Fish is the main food for village people during summer, eaten raw or cooked. It is also salted. For the nomadic Nenets, preserving food was a new phenomenon; while migrating nothing extra was carried. But settled Nenets have learned from their neighbours how to preserve meat and fish. Meat is preserved frozen (some households have freezers for summer), salted, or canned. Fish is preserved by salting. A local way is to sour fish by salting it so slightly that it does not rotten totally, but does not get salty. Berries are preserved in their own juice (especially cloudberries) or cooked into jams, but sugar is needed for the latter, and this must be bought with money. Store-bought products are not preserved except for
cabbage, which people buy in autumn, and salt it for winter. In general, many products are bought in bulk, especially sugar and flour, and stored.

CHANGE OF THE LOCAL DIET

Food preference is also an important part of food security. People often say that ‘real food’ for them is food which they have learned to eat from childhood. ‘We were raised on fish’ or ‘it was meat we were brought up on’ Still, the local diet has not remained unchanged.

Since the integration of the area into the Russian state, new items have been introduced slowly but steadily, especially since the Second World War. Boarding school systems, where children of nomadic families or from small villages lived for nine months of the year, introduced new foods to their charge. Through school and kindergarten new items, such as vegetables and fruit, were introduced. State policy has had an impact on the local diet. At about this time, Soviet scholars studied the nutrition problems of northern areas for both newcomers and indigenous people and they recommended that more fruits and vegetables should be imported to the area and more dairy products produced locally. However, local products (meat and fish) are necessary for health, and there should be no quick change in the diet (Astrinskiy and Navasardov 1970; Yakovleva 1977). Some villagers recalled that they were not allowed to eat raw reindeer meat at boarding school, but their children are permitted to eat raw meat today. Raw meat and fish were considered part of the local traditional diet.

Eating is a private thing in the village. During the Soviet era, there used to be a canteen where people had their lunch. Some even went there to get their dinner to bring home. Now, eating takes place at home. People rush home at lunch hour to eat a meal they prepared the evening before, and then return an hour later to their workplace. Only children have an opportunity to eat outside the home, first in kindergarten, then later in school.

School provides a meal to all schoolchildren. For children from families with social problems, three meals are provided. Meals consist of meat or fish, potatoes, pasta or rice, and they do not differ very much from home-cooked meals except that vegetables are served more often. For children from poor families, these meals are the only way to obtain healthy food. School and kindergarten kitchens use local meat, fish, potatoes and berries, bought from local enterprises or directly from private sellers.

Since the collapse of the Soviet planned economy there has been continuous change in supply. The mid 1990s was a period of scarcity when people could not buy many things. The stores usually did not have a lot of variety and goods were of low quality. As the economic situation improved, the stores began to provide more goods and wider choice. The availability of various food items has increased significantly; however, the price of many items is far too high for many villagers. People who live only on their salary from the agricultural cooperatives or pensions can afford only basic food products. Some families with social problems do not spend their money on food but on alcohol. People are also learning to develop other consumption patterns. In the Soviet Union, the distribution of goods was controlled from above, and people did not need to make any decisions of consumption: they bought what was available. Now they are learning to make choices between different trade marks,
advertised on television, or of quality, and of course by comparing prices. Thus, they are learning completely new social practices (Humphrey and Mandel 2002).

In Krasnoe, people often showed their discomfort while watching ads on TV. ‘They are advertising all kinds of things, and we believe everything not knowing if it is good for us or not,’ said an older woman several times. However, people were willing to try new things, if they could afford them, but considered items that were available already during the Soviet period more reliable. The origin of food was also an issue. Several people told me ‘write that there should be more Russian products, there are too many foreign products.’ For my Finnish eyes, the majority of products were Russian, but now sold in colourful packages. Many older people preferred products that were bought in bulk and not in packages, partly because they are cheaper that way. The quality of some new items has also been an issue. For example, the quality of butter seemed to be a constant issue. In Russia, butter made of milk and margarine made of vegetable oil have the same name, maslo, which confuses people. They buy margarine thinking that it is butter, and are disappointed because the taste is not the same.

During fieldwork in 2001 and 2002 I had a good opportunity to observe how new items are accepted. All villagers received a parcel of humanitarian aid originating from the USA, which consisted of rice, beans, peas, vegetable oil, and milk powder. Most people did not like powdered skim milk (‘it is like drinking water’), beans (‘no idea how to cook those’), and peas (‘they are yellow, right peas are green’). People had real doubts about the quality of vegetable oil because it was so different from what they would usually use. Whether these products were used or not depended upon a household’s economic situation. Poorer families ate everything (‘if you are hungry you learn to eat beans [they were usually cooked and then ground]), while others donated the goods to poor families or families with animals.

LOCAL FOOD SECURITY

Based on our observations, and in consideration of the components discussed above, we can describe, at least in general terms, the state of local food security. Some of the more crucial questions relate to whether the local population has access to local food resources and whether reindeer herders can make their product, reindeer meat, available to the rest of the village population.

Decision-making relating to land use is a crucial factor for all modes of traditional land use. In this region, the land is owned by the Russian state which decides how it is to be used and on what terms. Local officials often argue that the continuity of traditional land use must be protected even under conditions of oil and gas development, which can radically alter the environment and affect ecological stability. It has yet to be seen whether reindeer herding, hunting, and fishing will be possible when oil and gas resources have been depleted. On the other hand, fishing and hunting regulations are seen as an obstacle to traditional food procurement by local people, who state that they know how to utilize and manage local resources without interference from the outside.

The local economy is greatly impacted by economical and political decisions made in the southern areas; whether salaries in the public sector and state benefits are paid is not determined solely by local policy. At the same time, monetary income is needed for infrastructure and operations, such as mechanized means of transport and
fuel, which are imported to the area. Thus, traditional livelihoods are dependent upon non-local resources and economies. For example, the herders have to buy fuel to transport meat to consumers and a household’s ability to use fish and wild meat resources depends on its economic situation, and this can vary greatly between households.

In Krasnoe, food security is therefore best described in relative terms. In most households, people get enough food; it’s the nutritional value of that food that has yet to be determined. However, there are households whose members do not get enough food or healthy food. There are also households that cannot obtain culturally adequate food (that is, mainly local food). The most important issue that has been brought to light by this study is that traditional land use is greatly threatened by industrial development.

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Chapter Twelve

Food Security in Northern Russia: RAIPON-AMAP Project "Contaminants, Food Security and Indigenous Peoples of the Russian North"

Larissa ABRUTINA

The English name of the organization I represent is the RUSSIAN ASSOCIATION OF INDIGENOUS PEOPLES OF THE NORTH (RAIPON). This name, however, is not a direct translation from the Russian. Our peoples are designated in Russian legal documents and scientific publications as 'Small Indigenous Peoples of the North, Siberia, and the Far East.' They are defined in Russian law as 'peoples inhabiting the traditional homelands of their ancestors, maintaining their distinct way of life, recognizing themselves as a group with a separate ethnic identity, and numbering less than 50,000 each.'

It should be noted that, for various historical and other reasons, the treatment of our peoples by the Russian state is in some ways different from practices in other circumpolar countries. This is evident in practices of land use, self-government, economic activities, and other areas. Taken together, those differences affect both human health and ecological security.

Thirty indigenous ethnic groups in the Russian North, Siberia, and the Far East are formally recognized as Peoples of the North. They inhabit vast territories in 27 administrative districts of the Russian Federation (5 Republics, 4 Krais, 10 Oblasts, and 8 Autonomous Okrugs). The Peoples of the North number about 200,000 persons, an insignificant proportion of the regional population (2-10% on average). The peoples inhabiting the Arctic and Far North regions share such common features as dispersed settlement patterns, migratory mobility, and participation in a traditional economy.

The development of indigenous peoples of the Russian North has met with challenges and successes. At present, many believe that our peoples ‘are driven to the verge of extinction in social and economic terms, to the verge of depopulation and degeneration in demographic terms, and to alienation from power in political terms’ (R.G. Abdulatipov).

Development plays into the hands of natural resources companies by allowing them to destroy and pollute pasture lands, rivers and other natural features in the areas of traditional nature management with impunity. Private industrial interests eas-

1 Отчетно-перевыборное собрание НГОО «Шория» — Russian Association Of Indigenous Peoples of the North (RAIPON)
2 For brevity, the following terms are treated as synonymous throughout the text: people(s) of the North, aboriginal peoples, indigenous peoples, small peoples, aboriginal (an individual).
ily achieve their goals within federal and local governments who support the continuing integration of small peoples into technological culture.

This perhaps explains the sharp decrease in state-sponsored delivery of food and other necessities to territories exercising a traditional lifestyle. Education, health and other social services are becoming ever less available in rural areas. Access to basic subsistence channels has deteriorated for small indigenous peoples of the North who remain in the regions of traditional lifestyle. As a result, aboriginals migrate *en masse* to populated areas where they become marginalized.

There is no work for aboriginal peoples who move to cities. More than 30% (and in some urban areas 100%) are unemployed, though able to work. Unemployment is especially high among young people and women. In many cases, aboriginals subsist only on gathering wild plants and fishing in the outskirts of cities and villages. This activity presents certain dangers due to polluted ecosystems. Thus, peoples of the North plunge into poverty, hunger, and ecological disasters to varying degrees.

It is worth noting, however, that new laws and large-scale governmental programs are constantly being developed and adopted to solve problems facing the small peoples of the North. In recent years, some forms of partnership with indigenous people have started to emerge. Unfortunately, all such political, legal and economic measures turn out to be unsuccessful or they are simply not implemented. The lack of implementation mechanisms and inadequate financing are considered to be the two main causes of the deadlock.

I would offer two more causes: the ‘shock state’ of the peoples of the North, and incompetence and lack of political will in the upper levels of government bureaucracy. The peoples of the North remain the object of external influences and manipulation rather than communities taking control of their own fate.

This all inevitably affects the health of the peoples of the North, as is evidenced by the results of medical and demographic studies. It has been shown that the average life expectancy in the Russian North is 3–4 years shorter than in the rest of the country. The lifespan of northern aboriginals is shorter yet—statistics show 10–11 years shorter than the average Russian.

Local data reveal a rather early average ‘age of death’ for northern aboriginals. For instance, in some regions of Chukotka and Khanty-Mansi Autonomous Okrug it is as low as 37 years.

Infant death rates for peoples of the North have always been high. From the mid 1960s to the late 1980s, it decreased from 115 to 35 per 1,000 born. Now the pendulum has swayed in the opposite direction, and all the medical and demographic ‘successes’ of the previous decade have been lost (D. Bogoyavlenski). According to the State Committee of the Russian Federation on Statistics, the infant death rate for the peoples of the North was recorded as 37.3 per 1,000 born for the period 1995-1997.

Data published by the Chukotka Administration shows the infant death rate for the peoples of the North was 44.6 per 1,000 born in the period 1991-2000, and in some years it surpassed 60 per 1,000. In the Taimyr Autonomous Okrug, the infant death rate was 67.6 per 1,000 in 1992 (whereas the average infant death rate for Russia was 18 per 1,000).

Other public health indices are equally unfavourable for the peoples of the North. For instance, cumulative morbidity rates due to infectious and parasitic dis-
Tuberculosis morbidity is almost five times higher among indigenous peoples of the North than among non-aboriginals; tuberculosis mortality is 8.8 times higher (R.A. Khalfin, Health Ministry of Russian Federation).

However, a complete and unbiased picture of the medical and demographic conditions of the indigenous peoples of the North is not available since statistical and research data are incomplete and uncertain; however, even the available fragmentary medical and demographic data show that morbidity and mortality rates for this population group grow steadily.

Human health depends on appropriate health care systems only for 10%; on heredity for 20%, and for 60 - 70% it depends on natural and social environment, which includes way of life and food consumption, among other factors. Therefore, human health is not so much tied to medical factors, but to ecological and political ones. Early researchers and modern anthropologists alike agree that the indigenous peoples of the Russian North were quite healthy before contact with ‘European civilizations.’ Harsh climates brought about psychological, cultural, and biological mechanisms of adaptation in our ancestors.

One of the most important factors affecting adaptation and a strengthening of the defenses of an organism is food. Scientific studies have firmly established that the diet of northern peoples was initially based on protein and fat. Their staple food was the fatty meat of reindeer and marine mammals; foods that replenished their daily energy losses. The traditional daily diet of an adult Inuit in the early 20th century consisted of 1.8-2.2 kg of marine mammal meat (Krupnik 1980).

Meat and fat still remain essential components of the diet; along with plants, they are the main source of energy, vitamins, and trace elements.

This unique diet composition resulted in the creation of specific genetic mechanisms: a lower hormone level of the thyroid gland and pancreas; and biochemical decomposition of fats prevailing over their synthesis; and, proteins rather than carbohydrates as the main source of energy.

It should also be noted that prolonged breast feeding—to the age of 6-7 years—has always played an important role in immunity. The present-day diet of northern aboriginals is very different; and for new conditions, specific adaptation mechanisms are no longer needed. Even worse, some are simply ‘harmful.’ What once protected their health, now facilitates its deterioration, and becomes the cause of many diseases and congenital deformities, with mental disorders among them.

This grave anthropological and ecological problem is caused by many external factors which may be categorized in three large groups:

**First group**—change of diet. The introduction of carbohydrates, which are foreign to aboriginals' metabolism, into diet disrupted the centuries-old mechanism of food assimilation.

**Second group**—inadequate supply chains for northern territories. Other food delivery channels are inaccessible or prohibitively expensive. Monetary income of Russian Northerners is 2-3 times lower than the country's average, while that of aboriginals is even less. As a result, 70% of women have insufficient food, vitamins, and trace elements intake (R.A. Khalfin, Health Ministry of Russian Federation).
Third group—environmental pollution. A part of pollutants is domestic waste. It is generated everywhere: in a small tundra community and in large cities. People neglect elementary rules in places where they live. Many settlements lack waste processing facilities. Sewage is dumped into rivers and lakes, then the water is used for drinking and fishing.

The industrial development of the northern territories plays a critical role in the destruction and pollution of the environment. While it is easy to observe local industrial developments and their consequences for the environment, the impact of less obvious human-induced changes is no less harmful for human health.

Nuclear tests are first and foremost among these. It is likely that these tests contributed to the spread of cancer in affected areas. Without a doubt, radioactive components of abandoned coastal beacons are very harmful for human health. Another major source of pollution is the use of chemicals for agricultural, industrial and other purposes, both in northern and southern regions.

It should be noted here that not only industrial and military players polluted the environment in regions of traditional nature management; aboriginals themselves also contributed to pollution. For instance, during the Soviet era, deer-raising farms treated herds with chemicals to protect the animals from bloodsucking insects. Safety measures were often disregarded, resulting in water pollution, poisoning people, animals and fish. While traveling in the tundra, on many occasions I observed mass deaths of animals and birds in areas treated with chemicals.

My parents and older countrymen told me that when deer were infested with mange, DDT was used to treat the animals. Herders dug holes, filled them with DDT solution, and passed all deer through the holes. People had neither knowledge nor experience in handling such chemicals, they were not alerted against any dangers. As a result, they also used DDT derivatives in their everyday life: to treat their yarangas and tents, to wash floors in their homes, and even to wash themselves. They re-used poisonous chemical containers to store water, knead paste, and prepare span.

Now the use of chemicals has decreased: state-run farms are nonexistent, the deer raising industry experienced economic hardships, and any chemicals, even veterinary drugs, are not very affordable. But, as we know, the Northern environment was already polluted, and reclamation and rehabilitation efforts will take a long time due to the tundra’s lack of ability to self-clean and filtrate. Infectious and chemical pollution, combined with biological features and cultural traditions, become risk factors, especially for those aboriginals who maintain traditional lifestyle and diet.

The most detrimental for human health is the accumulation and transfer of harmful substances from mother to baby. Prolonged breast feeding facilitates the ‘chemicalization’ of children. Harmful substances in newborn aboriginal children is 2-10 times higher than for those in southern regions of Russia. Even though it is not the cause of immediate and obvious contamination, it is a long-term cause of lower immunity and higher morbidity and mortality.

It is known from research literature that 75% of newborn aboriginal deaths can be attributed to congenital pathologies: genetic or maternal disorders causing congenital malformations. Unfavourable environmental factors show strong correlation with stillborn rate and incidents of cataracts, mental disorders, and mental de-
ciencies (V.I. Narodtski, Chukotka). It follows that environmental factors in the North need detailed research. But this is not an easy task in Russia now, or was it possible in the past.

Northern regions were administered under special security provisions introduced in the Soviet era when military and industrial development of the territories began with the establishment of numerous correctional labour institutions (camps). Enhanced security was characteristic of Arctic regions—there were closed zones with a boundary regime. Accordingly, regional development was governed by secretive Party and government decrees and regulations. It was impossible to obtain any environmental information.

If, in the past, it was not possible to get information about environmental conditions for political reasons, today it is not possible for financial reasons. Whatever the reasons, the result for indigenous peoples of the North is the same: a complete ignorance of ecological dangers and means to overcome them. Neither is Russian environmental legislation of great help, despite its relatively high level. It takes into account only the interests of indigenous peoples who have certain rights in nature management and the protection of environment.

There also exist regional nature management laws and regional environmental programs, but the implementation of federal and regional legislation is ineffective or practically impossible, a result of many years of neglect of ecological problems, insufficient financing, and many other reasons. Besides, an analysis of the programs reveals that they are designed to solve the ecological problems of individual settlements, including those with indigenous populations. Meanwhile, vast territories, which are essential to the traditional way of life of indigenous communities, remain outside the framework of ecological programs.

The situation is made worse by a lack of legal knowledge on the part of aboriginals, apathy, and a lack of protection by local governments. These might be the only reasons for the absence of legal action on the above issues.

The 3rd Arctic Leaders’ Summit was held on 14-16 September 1999 in Moscow. One of the articles of the Declaration adopted by the Summit supports the implementation of a research project designed to study the impact of persistent toxic substances on the food security of indigenous peoples. The development and implementation of the Arctic Council's project ‘Persistent Toxic Substances Food Security and Indigenous Peoples of the Russian North’—RAIPON/AMAP/GEF—is an important milestone for the small indigenous peoples of the Russian North.

The duration of the project is three years. It is carried out under the framework of the Arctic Monitoring and Assessment Programme (AMAP) with the participation of GEF (Global Environmental Facilities) and RAIPON.

The objective of the project is to study the presence of persistent toxic substances in the natural environment and in humans. The first phase of the project began in 2001 in four Russian Arctic regions: in the Murmansk Oblast, and the Nenets, Taimyr and Chukot Autonomous Okrugs.

The settlements of Lovozero and Krasnoshchelye were selected for research in the Murmansk Oblast; the settlements of Nel'min Nos and Indiga in the Nenets Autonomous Okrug; the city of Dudinka and the settlements of Khatanga, Novorybnoye and Kheta in the Taimyr Autonomous Okrug; and the Chukot (the settlements of Lavrentiya and Uelen) and Anadyr (the settlement of Kanchalan) regions in the Chukot Autonomous Okrug.
Among the participants in the project are the researchers of the North-Western Scientific Centre for Hygiene and Public Health and the Regional Centre for ‘Arctic Monitoring’ (Saint Petersburg), foreign and Russian laboratories, the Centre for International Projects of the Ministry of Natural Resources, medical personnel of health care institutions, regional centres of the State Department of Sanitary and Epidemiological Control and others.

I am the RAIPON Project Coordinator. My task is to represent the interests of the small peoples of the North. For that purpose I must help researchers focus their efforts on priority issues, and help them with project implementation by creating a network of local facilitators from members of the Association. For the most part, the facilitators are medical specialists whose nominations were supported by local associations.

Together with researchers, I made several trips of all the regions and settlements under study. Everywhere we met with local authorities, Associations of small indigenous peoples, health care officials and State Sanitary centre’s personnel. We also had meetings with local populations in which project participants provided information on the project’s objectives, and answered questions. The meetings were broadcast on radio and TV and covered in local newspapers. Such interactive meetings helped us better identify our priorities. They were also helpful in finding logistical solutions and promoting awareness of the importance of the project, building bridges between the researchers and the population.

We distributed booklets with information on the project, and answered questions. Most often people asked if the research results would be published. They were concerned that the results of the research might be restricted or labeled ‘classified’ as it had in the past. Their concern is certainly understandable, and their desire to obtain information about their environment is perfectly legitimate, but it is too early to discuss the results of laboratory research.

In the first phase of the project, i.e., in 2001, researchers from Saint Petersburg, together with local medical specialists and members of the Association, began fieldwork. Researchers, with local medical specialists and regional facilitators, sampled and tested blood, breast milk, soil, fish, deer meat, and berries. A questionnaire survey of population was also conducted. Researchers from various scientific centres took environmental samples of water, air, and soil. Tissues of marine mammals, deer, elk, wild fowl, fish, and samples of wild plants were also taken for analyses.

The second phase of the project began in 2002, as planned, under the title ‘Assessment of Local Sources of Pollution in the Vicinity of Selected Settlements of Indigenous Peoples of the North.’ During this second phase, an inventory of local environmental pollution sources was taken. First among them are industrial facilities and organizations that openly pollute the Arctic environment. Their type of ownership and administrative affiliation are irrelevant. At present, collected samples are analyzed in laboratories.

Project researchers submitted the results of their work at the 2001-2002 Second Congress on Monitoring and Assessment of Arctic Environment held 4-6 October 2002 in Rovaniemi, Finland. The results show that the main environmental pollutants of the Russian coast of the Arctic Ocean are heavy metals and persistent organic pollutants (see www.amap/symposium2002). As a general rule, however, researchers do not associate this with the contaminant content of food, since it does not exceed the average for the Arctic. They attribute its cause to the structure of the diet.
of aboriginals of the Russian North, for which 80% consists of products of hunting and fishing and wild plants. Researchers believe that this is a result of a return to subsistence-based eating habits, caused by a prolonged social and economic crisis bearing especially hard on indigenous northern peoples. Based on that evidence, researchers conclude that today's ethnographic features are no less significant for the health of the indigenous population of the North than technologically induced pollution of their habitat. I do not quite agree with their assessment.

First, a subsistence-based diet cannot provide for survival today, as it did in earlier times, since wild animals, fish, and plants have been decimated by industrial development or poaching. Second, the wide-spread consumption of imported food in the Russian North began in the Soviet era, especially in the years after the Second World War. It can be said that before that time the diet was subsistence-based, similar to that of hundreds years ago. Studies on the dietary structure of northern aboriginals by Krupnik and other researchers support this view. The question is, Why was the so-called subsistence-based diet of the last century less harmful than that of today? Maybe the average level of pollution in the Arctic was lower in those days? Maybe that level should be designated as normal, while the today's level should be considered as very high? It seems to me that the purpose of research is finding the truth and not defense of industrial sources of environmental pollution.

Now is the right time to implement the project. It is not yet too late to seek answers to the question: ‘Is the Russian Arctic polluted?’ and ‘If it is, then with what and how badly?’ It will also help us identify ways to solve ecological problems. This project corresponds closely with the thoughts and aspirations of the indigenous peoples of the Russian North and to the decisions adopted in resolutions advanced at northern aboriginal conferences. We hope that the implementation of the project will provide reliable data on environmental pollution and traditional food contamination. Then we will understand more about the influence of ecological factors on the health of indigenous peoples.

Our confidence is based on several features of the project.

- this is the first project of its kind;
- all researchers have high professional qualifications;
- leaders in science and government have realized that some ecological issues of the North are urgent not only for the indigenous peoples of the North, but also for all of humankind.
- results of the project are open and accessible to the public;
- partnership relations have been established with the indigenous peoples of the North through RAIPON.

I would like to emphasize that this is a true partnership, not token posturing as is usually the case with Russian projects purporting to solve the problems of northern peoples. We are especially pleased that many researchers are trying to consider the questions through the eyes of Northern aboriginals. This worthy intention points to two important attitudes, at least. First, researchers are prepared to explore in new ways, and dig very deep in order to get to the ‘root’ of the problem. Second, the initiators of the project wish to establish partnership relations with indigenous peoples not only in words, but in action, as it is practiced in the West. On the one hand, it is encouraging. On the other hand, it is somewhat disconcerting. The Russian North
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and the North of other countries are not identical, and the small peoples of the Russian North are significantly different from the aboriginal peoples of other circumpolar countries. If those differences are not taken into account, then the partnership might not serve the project in any way.

Special approaches and techniques are needed to fully understand the world view of aboriginals of the Russian North. So I learned during many years of living and working as a doctor among reindeer herders, fishermen and hunters of the North, as well as during the initial phases of the project. It underlines the high priority of the question, if we, northern aboriginals and our organizations, are able to exercise such a degree of activity and responsibility that is necessary to achieve maximum results. At least, we are trying to achieve results, and I think that our actions are already bringing certain results. Regional coordinators in the areas involved in the research help investigators and other specialists identify environmental problems and teach about the aboriginal lifestyle.

We hope that research results obtained in the framework of the project will set the foundation for our contribution to discovering ways and tools to solve existing environmental problems and save our common planet. The RAIPON / AMAP/ GEF Project ‘Persistent Toxic Substances Food Security and Indigenous Peoples of the Russian North’ may become an important step on the path to solving the problems described in this report, and to the effective development of a non-destructive approach to the protection of the environment in the Russian Arctic.

REFERENCES


A GLOBAL VIEW
Chapter Thirteen

Food Security of Northern Indigenous Peoples in a Time of Uncertainty

Chris D. James PACI, Cindy DICKSON, Scot NIKELS, Hing Man CHAN, and Christopher FURGAL

INTRODUCTION

The circumpolar north is home to richly diverse cultures and biological diversity. It is a complex and sensitive region of the world, a region that the Arctic Council has identified as an ‘indicator’ of global processes. What the term suggests is that the circumpolar north is a region where global processes, such as the long-range transport of contaminants (such as persistent organic pollutants) or changes in atmospheric gases, and increases or decreases in global temperature regimes, are registered before and more intensely than in other parts of the world. The physical environment and the peoples of the circumpolar north are vulnerable to these global forces of change. By paying attention to changes to northern environments and northern peoples, the global community will bear witness to the effects of global change.

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1 This paper was first presented as a position paper to the Northern Research Forum on the Resilient North—Human Responses to Global Changes, held in Yellowknife (Canada) in September 2004.
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3 Executive Director, Arctic Athabaskan Council, also works for the Council of Yukon First Nations (CYFN), and is a member of the Vuntut Gwich’in Old Crow.
4 At the time of writing Scot was Director of environment, Inuit Tapiriit Kanatami (ITK), he is now special advisor to Mary Simon, President ITK.
5 At the time of writing Laurie was National Science and Engineering Research Council (NSERC) Northern Research Chair and a faculty member of Center for Indigenous Nutrition and Environment (CINE), McGill University. He is co-principle investigator on the Climate Change Impacts Adaptations Directorate (Natural Resources Canada-NRCan), Earth Science Secretariat research on climate change and human health, under the Impacts and Adaptation Program. Laurie is now at the University of Northern British Columbia.
6 At the time of writing Chris was a faculty member of Center for Health University of Laval (CHUL) and a co-lead of the Arctic Climate Impact Assessment Report (ACIA) Health Chapter. He is also co-principle investigator on the NRCan funded project. He is now at Trent University.
The effects of climate change are more deeply felt by northern Indigenous peoples because of their close relationship with their environment. While impacts will profoundly affect how people live and organize themselves in the north, adaptations to changes might provide the most important indicators. Research needs to focus on the impacts of change, not only to provide the world an early warning of consequences, but to indicate to those causing change the impacts of their actions, and the necessary actions and adaptations that will have to be made in response to such change.

Circumpolar Indigenous Peoples have lived through periods of dramatic changes, recorded through geological time. These changes are perhaps imperfectly understood; however, indigenous cultures have been shaped by and have adapted to the slow and sometimes violent changes that have molded the circumpolar world. In the past, anthropological and historical studies aimed to document and analyze these cultures for knowledge of the past, with a focus on cultural change. The knowledge of Indigenous Peoples, sometimes referred to as traditional knowledge, is now being made available in an effort to educate the world. Ecology, environmental and social history, action anthropology, as well as a host of post-modern methodological approaches have increased the array of questions and broadened research to focus on Indigenous Peoples’ knowledge of ecological change, including causes and predicted future directions for adaptations. Most geographers and climatologists are studying climate change independently of Indigenous Peoples and social scientists; however, by combining the various approaches and forms of knowledge, patterns of past changes can be mapped and assumptions regarding the movement of peoples as a means of adapting to major climactic events can be challenged.

Recent scholarship has considered human occupancy and land-use, traditional knowledge, along with the results of various scientific studies, to gain greater insight into how peoples were impacted and adapted to change (Berkes 1999, Jolly et al. 2002). Interdisciplinary approaches are proving to be an effective means of understanding climate change and its impacts for Indigenous communities (Krupnik and Jolly 2002). A comprehensive review of the science (data sets and quantitative as well as qualitative values), lived experience (traditional and local knowledge), and analytical forecasting (predictive models) must be considered together to assist northerners who are developing a more complete understanding of the future of circumpolar ecosystems—what are the implications of a changing climate to both the immediate and long-term survival of northern cultures/ways of life (NTI et al. 2001)?

Systematic approaches to research on climate change are relatively new. By its very complexity, climate change research calls for interdisciplinary approaches (team or individual). As a field of inquiry, it is still, relative to other intellectual areas, under-resourced and open to new approaches and theory. More climate change questions are unresolved than those for which we have a firm and conclusive answer. Questions remain related to methodologies used to study climate change, as well as to the results endorsed. Climate change research is progressing, as all areas of inquiry do, and the uncertainty that currently exists is nothing out of the ordinary.

The circumpolar north has witnessed extremes of climate—from tropical to glacial periods. Evidence exists for significant episodic cycles of warming and freezing, during and between periods of human occupancy. For example, in the high arctic, evidence of huge trees is uncovered. There are also records (oral and written)
of periods of glaciation. Why, then, is the current global warming trend alarming so many scientists, community members, media, and politicians (on either side of the debate)? The reason is that the causes of current climate change are attributable to lifestyle—western consumption patterns (contingent as they are on fossil fuels)—increasing the rate of warming and interfering with natural processes in significant and, while debatable, predicted ways. The debate is heated, because most consumers are unaware of the detrimental effects of their behaviours on local, national and global environments. In other words, the side-effects of current lifestyles are changing global processes; to address these changes, people must be made aware of and work toward changing their consumption patterns. Those in developed countries (in particular upper middle class) are affluent; others (in developing countries) seek to attain the same level of affluence. There is serious pressure for an upward spiral of consumption rather than a slowing and reversal of the many causes of global warming.

Current international attention on climate change relates to a more recent period of warming, precipitated by increased emissions of greenhouse gases, namely carbon dioxide (CO2), as a result of industrial development dating from 1850, a period of intensive industrial development in the western world, to more recent periods of growth, marked by more widespread use of automobiles and increased fossil fuel consumption (1930-2000). Anthropogenic influences have outstripped natural forces as drivers of global warming. The circumpolar region, as an indicator area of global warming, is a sparsely inhabited region of the world, where biodiversity is sensitive to changes, whose cultures have been tied for generations to the land, and which has been subject to only marginal development, except when used as a source of natural resources, or a sink for waste (e.g., contaminants).

Climate change impacts and adaptations related to traditional/country food production and consumption are very much an unknown; however, there are a number of stressors that are jeopardizing northern food production systems. Crises in food supply due to temporal fluctuations in wild resources are expected to become more frequent, last longer and be more intensely felt. These assumptions are based on what scientists’ modeling scenarios suggest, as well as on what elders say is foretold in oral history. It is reasonable to suggest that climate change will increase temporal fluctuations in species distribution, abundance, morphology, behaviour and community structure’ (Dickson 2003). The impacts of climate change may be most acutely felt in northern Indigenous homes, where people have had limited capability of letting the rest of the world know what is going on. Households have a relative ability to adapt to impacts. Climate change threatens various aspects of northern traditional cultures and lifestyles, but adaptation is not necessarily supported by economic access to modern alternatives. The technology fix has changed considerably since the 1970s into a trap.

Since the 1970s, circumpolar Indigenous Peoples have been politicized, and actively organizing themselves and communicating their collective views, based heavily in a rights discourse (Aboriginal rights and title), domestically and globally. Examples from northern Canada include the rejection of the 1969 White Paper (Asch 1997; Erasmus et al. 2003), of the development of the Mackenzie Valley Pipeline (Watkins 1977; Berger 1977), and protests against long-range contamination of traditional/country foods (Jensen et al. 1997; Watt-Cloutier 2003). The creation of Nunavut, in some ways, parallels the political organization of the Sami; both are
demonstrating institutional responses to state governments. The Sami Parliament and Sami University are two examples of innovative Indigenous institutions. Similarly, the inclusion of Permanent Participants (six northern Indigenous Peoples organizations), in the Arctic Council was born out of the Council’s objective to protect the arctic environment, an environment characterized by a rich plurality. Northern Indigenous Peoples’ articulation of their local, regional, national, and international environmental and social concerns has triggered a more widespread social support for the recognition and retention of Aboriginal and minority rights. The audiences for these arguments have been primarily national governments (states) and international communities of states (United Nations, Arctic Council).

A CANADIAN RESEARCH PROJECT

What do food security and climate change have in common? At the broadest scale, they are interdependent—as the climate changes, so does food security. A warming or cooling of the climate will have impacts on the relative abundance (or scarcity) of certain resources, and could even lead to the introduction of new resources or the extirpation of certain species. Individual food items, such as cranberries, as well as entire food systems (household, community or regional diets) will be impacted in different ways. New resources might be invasive species moving into a region, as is the case of the tree line moving north into what was once tundra, or the movement of wild species such as deer north of 60º, and so on. New food items might also be the result of an introduction of store bought foods. How each society, sub-group, or household within a society adapts to changes will impact the entire system to some degree. There are global implications for the kinds of food systems currently in place.

Northern traditional food systems are local. In the circumpolar north in particular, trading of goods was at a regional level and on a small scale, a significant feature of traditional food systems that persists more or less. Production and consumption of traditional/country foods is relatively small scale; however, traditional food systems continue to rely primarily on local resources. The means (labour and technology) of gathering and processing resources remains at the level of the household. Opportunities for community or cooperative hunts persist; however, levels of sharing may be declining. It is thought that the amount of food required by most families in any given community can be met by local resources. However, research is required to substantiate this thesis.

Northern Indigenous food systems have, over time, adapted to include modern technologies and foods (metal hunting and cooking implements; flour and sugar). ‘Modern foods’ have been acculturated and assimilated at various speeds and intensities. Almost always, an introduced item would be adapted in some way, to fit with northern realities, i.e., Indigenous lifestyles and environments. If a new food item did not fit for any reason—whether because of problems with storage, cost, or some other reason, it did not last in the system. As food systems change, so are northern communities exposed to a wider variety of foods. It has been argued that, forced or unintentional, the introduction of ‘modern’ items to Indigenous lifestyles, whether food or other items, causes a range of problems that ultimately undermine Indigenous cultures (Greenblatt 1991; Tough 1996; Krech 1999; Minnis and Elisens 2000).
Traditional/country food systems continue to be characterized by strong inter-relations between culture and land. Traditional food is embedded in cultural practices. The health of Indigenous cultures continues to be a reflection of the relative health of their lands. Spirituality, language, and economy are manifestations of the offerings of the land and what the land will provide in the future. The degree of flexibility and adaptation in traditional food systems depends on the land and the people, on the types of changes, and the reasons for them. For example, over time rifles replaced spears, just as snowmobiles replaced dog sleds; each transformation has brought a host of ecological and cultural ramifications.

In contrast to traditional food systems, modern ones tend to be based on large-scale import/export foods grown for mass consumption. There do exist small-scale (i.e., local organic) systems, but these do not form a majority of commercial producers. Modern agricultural practices are dominated by industrial food systems that benefit from expansion and investments of scale, growing practices (use of herbicides and pesticides, antibiotics and growth hormones) mechanization, transportation, preservation, and other anthropogenic influences. They rely on markets of consumers who are not able to provide their nutritional needs for themselves through gardening, fishing and hunting. The general orientation toward increased and faster production and lowering costs (to boost profits) has resulted in innovations. But, this has also led some critics, in particular those who support organic farming, to ask: “is there anything that’s really safe to eat?” (Hawaleshka 2004).

In terms of geography, commercial farming has little opportunity in the north, with some exceptions. Northern environments present some challenges, including poor soil quality, low average precipitation and temperatures, low light levels (durations), and the occurrence of discontinuous and continuous permafrost. Greenhouse and hydroponic grow operations are largely uneconomical at this time (compared to the cost of energy and transportation of readily available and relatively inexpensive southern products). Northern rural and remote communities require additional infrastructure (e.g., to support such things as transportation and packaging), and such developments would have other impacts (e.g., they could create wastes that are unplanned, causing unknown problems), and they are unsustainable.

If traditional food, such as caribou, were to become scarce in a traditional territory, local residents would have several options. If they perceive the change to be temporary or determine a local cause for the population decline, they may opt to go further a field to locate caribou herds. If hunters are not able to follow the caribou, or if the caribou population has been extirpated, the people may switch to lesser foods. By ‘lesser,’ we mean that the effort expanded to secure the resource is greater than the return, or the food is less valuable, nutritionally speaking, than another.

There is feedback in the relationship between climate change and food security: as the climate changes, so too does the security of foods and food systems. Furthermore, both are discernable at various ecological levels—from landscape to population. Therefore as the climate changes, so too do ‘community patterns of traditional food use’; changes that, collectively, can be considered an ecosystem onto itself (Kuhnlein et al. 2003).

An ecosystem can be thought of as relationships between living and non-living organisms; that is, a net pattern of growth and decline with qualities such as
robustness, flips, chaos, cooperation, changes, constancy, etc. Ecosystems comprise
of energy patterns, cycles, and a host of organisms. All these components and
characteristics are inter-related and depend on constants, such as soil chemistry,
moisture and temperature, balance between predator and prey populations, etc.
Similarly, food security depends on a balance between supply and demand.

For a traditional/country food system to be secure there must be a patterned
and predictable supply and reserve of a range of foods (Kuhnlein et al. 2003). These
foods can either be seasonal or available all year; however, the sum total of
traditional/country food must meet the dietary requirements of a population; that is, a
balanced diet of vitamins and nutrients that contribute to a relative state of health.
Climate that is predictable and consistent (patterned and seasonal) has a profound
influence on the ecosystem, with a range of human social organization(s) integral to
the functioning of such systems. It is important to understand the security of what
has been, is now, and is predicted to be on the land. The basis of Indigenous cultures,
Dickson (2003) notes:

The Canadian north is vast, rich in natural resources and includes the
boreal forest, taiga and Arctic ecosystems. Indigenous peoples top
the food chain in all three ecosystems. Athabaskan peoples in
northern Canada eat large quantities of traditional foods obtained
through hunting, fishing, trapping and gathering. Since market foods
are much more expensive in many northern communities than in the
south, traditional food provides many components of a quality diet at
relatively low cost.

Besides its nutritional values, the traditional diet is also a source
of cultural strength and is critical for the social, mental and spiritual
well-being of individuals and communities.

As the climate changes, will we be able to predict the changes in precipitation,
vegetation, species, etc.? If we can discern the conditions that maintain the
ecosystem as we know it today, even if we’re not sure of the conditions under which
it was created, can we predict what the impacts will be if the average mean
temperature were to increase or decrease over time and space? Can we predict
possible future scenarios of food availability? Can we project population growth, and
traditional food consumption patterns, to chart future demand? The impacts on the
‘social, mental and spiritual well-being’ for northern Indigenous peoples are not
easily measured and factored in.

Relatively few research studies to date have contributed to our understanding
of future conditions under present climate change patterns. Predictive models cannot
be taken as law, as the systems under study are profoundly complex and dynamic.
Cause–effect relationships are not so easy to discern, subtle changes can escape
manipulation, and households and/or communities often find unconventional ways of
adapting to change. Research needs to focus on indicators of change and adaptation,
and researchers must begin to ask how future warming trends will be managed with
both new and conventional methodologies. Rather than simply painting an alarming
picture of significant change in global systems, the focus should be on how local
communities are adapting to changes in, for example, the hydrological cycle or other
ecological functions (will there be new and/or radically altered systems resulting
Chapter 13: Food Security of Northern Indigenous Peoples in a Time of Uncertainty

from changes?). Northern ecosystems are particularly vulnerable to change because change will be so dramatic in the circumpolar regions (ACIA 2005, Newton et al. 2005). In the north, then, research must focus on a holistic approach to climate change impacts, examining the uncertainties in traditional food systems.

Once such research study has been launched in northern Canada (Chan, Furgal, Nickels, Dickson, and Paci), bringing together interdisciplinary expertise in a team from McGill University, Université Laval, Inuit Tapiriit Kanatami, the Council of Yukon First Nations, and the Dene Nation working with three northern Indigenous communities: Deh Gah Got’ie First Nation (Fort Providence, Northwest Territories), Whitewater First Nation (Beaver Creek, Yukon) and the Inuit community of Kangiqsujuaq in Nunavik (northern Quebec). This is a three-year collaborative project titled Impacts of climate change on food security in three northern Aboriginal Communities-Plans for adaptation, funded by the Natural Resources Canada, Impacts and Adaptations program, in the area of climate change and human health.

Dr. Chan, CINE at McGill University, is leading the Denendeh and Yukon investigations, while Dr. Furgal, Nasivvik Centre for Inuit Health and Changing Environments at Université Laval, is leading the Eastern part of this project. Northern communities differ in that they rely heavily on terrestrial, freshwater and marine resources, depending on proximity and traditional/historic patterns.

One objective is to understand the potential health impacts of climate change on an important aspect of the lives of northern Indigenous Peoples. Community-based studies in the Deh Gah Got’ie First Nation, Whitewater First Nation and Kangiqsujuaq, representing different ecological systems and traditional food economies for terrestrial as well as coastal ecosystems, present the context. Northern communities differ in that they rely heavily on terrestrial, freshwater, and marine resources for food, depending on proximity and traditional/historic patterns. Inuit, First Nations, and Dene communities, like others in the north, have strong ties to the land, especially through traditional activities such as hunting, whaling and sealing, trapping, berry picking, and fishing. This research aims to develop a framework in which to explore climate change scenarios, adaptive strategies in response to change, and identify impacts on food security, and the effectiveness of traditional knowledge and decision-making under changing conditions.

There are limits to what can be determined, but it is hoped that research can answer questions related to adaptation. While traditional knowledge cannot be captured in a scientific model, we know that we can consider basic representations of traditional knowledge, as it is currently known. While traditional knowledge changes with time (it is dynamic, responsive and reflexive), there is a fundamental continuity and connectivity with the past. The aim is to discern variation and the optimal conditions under which traditional knowledge-based decision-making is most effective. To some degree, then, the objective is to determine the robustness of traditional Indigenous decision-making processes. Both documentary and oral evidence of Athabaskan and Inuit traditional knowledge related to climate and climate change and its potential impacts on food security will be collected. During the first year of research, a workshop will be held in each community to gather and document traditional knowledge from key community members (experienced hunters/gatherers and elders), using established research methods (Kuhnlein et al.)
The project may lead to the development of protocols for strategic development, adaptations to minimize impacts on communities, and serve as a framework or model for development in other northern communities. Traditional knowledge and cultural practices will be considered along with biological information about wildlife, vegetation, toxicology, and diet (food composition, nutrients, food availability) particular to each community. The efficacy of this methodological approach will be measured by its ability to predict food security under environmental change scenarios, and as a result, serve to inform decision-making.

The Canadian-based research highlighted in this paper presents one step toward our understanding how traditional systems will cope with climate change. Eventually other jurisdictions, domestically, should replicate and improve the research. An international comparative research project should follow, and ultimately more research will be needed to ensure the methods and conclusions are robust.

THE ABILITY TO RESPOND TO ENVIRONMENTAL OR HUMAN DISASTERS

Sir John Houghton (2003), co-chair of the Scientific Assessment Working Group of the Intergovernmental Panel on Climate Change argued global warming was a ‘weapon of mass-destruction… our long-term security is threatened by a problem at least as dangerous as chemical, nuclear, or biological weapons, or indeed international terrorism: human induced climate change.’ Climate change can trigger or exacerbate further a number of problems, such as long-range contaminants in the north. Dickson argues,

Potential health effects of fluctuations of natural food resources on indigenous peoples may be indirect… environmental contaminants, long-range transport, accumulation and biomagnification in the Arctic environment will be affected by climate change. Predicting how climate change will alter contaminant mechanisms in the Canadian north in a global environmental context remains a challenge (2003:3).

Researchers from Laval University investigating climate and health in Nunavik and Labrador are demonstrating that environmental causes for Inuit can have both direct and indirect impacts for these communities (Furgal et al. 2002). In many cases there are far more indirect impacts that may be much more difficult to detect, but these are just as important if not more so, in terms of the importance to the community, than many of the direct impacts. For example, hydro demands in large North American urban centers will continue to have profound effects on communities that are directly and indirectly impacted by hydro-electric developments, including increased releases of greenhouse gases and mercury (Hg).

Newton (et al. 2005) note “with projections of more extreme natural events occurring in northern Canada, research is crucial to shape climate change policies respectful of local Indigenous wisdom and the aspirations of residents to share more fully in the growth and development of northern Canada. It is by no means an easy balance to achieve, but it must be done thoughtfully, guided by integrated hazards
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and climate research with a strong social dimension.” Climate change research has important implications for food security, and more circumpolar and comparative studies are required before cause and effect relationships will be known. Implications of food security have relevance to a number of areas including: implications for civil security in a world of globalization (including media and other cultural practices), education (culturally relevant), adaptations and vulnerabilities.

CIVIL SECURITY IN A WORLD OF MEDIA GLOBALIZATION OF CULTURE

There can be no civil security in a world where food safety, supply and quality, is uncertain. Uncertainty to food is experienced in many parts of the world because of unplanned development patterns, civil strife, war, and climate change, but there are other factors as well such as poverty. Industrial development and growth have not always lead to food security, but the pattern has been successfully implemented by developed nations for most populations. Food security is still somewhat uncertain in developing countries and for vulnerable populations in all nations. The globalization of food security measures, including the hegemony of western culture, is a significant concern for researchers and policy makers. The multicultural reality of the circumpolar world begs the question of who is being served by climate change representations, programs and policies, research, and education.

Environmental ‘injustice’ is at the heart of food security. The development of modern industrial food systems and consumption patterns in the developed world is a significant driver in climate change. Those who have a choice are mostly urban and first world consumers, populations sheltered from the uncertainty of supply by developing extensive commercial centers that attract wealth and bounty (markets) for food production systems. Those in developed countries eat well (perhaps too well?), but those in developing countries and fourth world economies do not have the range of choices, they instead face shortages and narrow or lesser nutritional choices. Global processes have a large impact on those who have little choice, such as on the northern regions of the world. There is an inequitable distribution of risk for food gathering activities, with relatively few (globally speaking) benefiting (from consumption of fuels etc.).

Media and other cultural presentations of food security issues are aimed at telling the story of industrial food systems, with little understanding of traditional food systems. This gives rise to some ethical issues. Unfortunately, it is a combination (such as in the case of contaminants) of cumulative global physical processes (atmospheric currents, or UV and Arctic atmosphere); inequitable distribution of resources (money, material, infrastructure); social change (modernity; lifestyle risks, health status); and cultural loss (culture shock, health and morbidity).

THE MEANING OF NATIONAL BORDERS IN A CIRCUMPOLAR WORLD

Climate change, like environmental contaminants, shows how the world, Gia, is a self-regulating and incredibly complex and resilient system of relationships. Within this complex global system of air and water currents, ecosystems and bioregions, there are extremely fragile edges and regions that are severely impacted by domestic patterns of consumption and waste. Nations, states, territorial and municipal governments can cause, prevent, regulate actions, to enable industrial developments.
These developments may abate, contribute or fail to account for environmental costs and services. Without adequate environmental standards in any of these jurisdictions, the circumpolar world pays the price. The cumulative effects of uncoordinated and unplanned development will impact food security, as it is being demonstrated today.

In Canada, the Northern Contaminants Program (NCP) articulates with the Arctic Monitoring and Assessment Programme (AMAP), investments to manage research, communicate results, and feed research into international policy instruments to reduce contaminants. This has been a Herculean effort by a relative few (Jensen et al. 1997, INAC 2003, Downie and Fenge 2003). Such an effort has not yet been made with regards to climate change, rather, the efforts are uncoordinated and under funded, for example in Canada, there is no northern climate change program feeding into a circumpolar process (not like there was on the contaminants issue).

What is sovereignty in the face of climate change? Global processes do not recognize the efforts of one state over the other. Preferential tax systems, exchange rates, languages, political structures, border guards, these mean nothing to moving tree lines, degradation of permafrost, or an ice-free polar ice cap. Climate change, in particular climate warming, will continue to be an issue that draws together all eight Arctic nations, either within the Arctic Council (as with the Arctic Climate Impact Assessment Report, 2005), or other international fora (Nordic Ministers, Baltic States, European Union, United Nations, NATO, etc.)

**CULTURALLY RELEVANT EDUCATION**

How should we approach climate change and food security? The environment is dynamic—always in a state of change, chaotic but ultimately predictable and marked by birth and death. The right context needs to be brought to education. As we have said elsewhere in this paper, various forms of knowledge and world views ought to be utilized and respected.

All too often southern and western systems of knowledge dominate the education of northern peoples, it has been used to colonize Indigenous Peoples. The systems of education that were in effect prior to contact are complex systems. Today’s education has been steeped in a rather short colonial history across the circumpolar north (Paci 2002; Bravo and Sorlin 2002). The University of the Arctic Programs, curriculum developed by circumpolar universities, and institutions built on a research/teaching focus on northern issues, are improving on past efforts, but has a long way to go. For example, Indigenous language teaching is addressing the hegemony and loss of small language families.

Food security and education are linked. Students and teachers will value (and eat) foods that are advanced by their institutions and curriculum. Culturally relevant education must address all aspects of northern Indigenous peoples’ lives, and reflecting their values. The double bind in which most jurisdictions find themselves, simply, is the trap of national standards and educational structures that negate local/regional interests. A conflict between ‘a national culture’ and the plurality of Indigenous cultures goes beyond standards, and includes assumptions about the viability of multiple cultures. If education is to support food security, it must advance traditions and plurality, and ecology, while serving the larger interests of improving how we relate to each other and ensure the environment for future generations.
Culturally relevant education must marry western science with traditional knowledge, both in delivery (pedagogy) as well as in research used to support our lessons.

**ADAPTATION AND VULNERABILITY IN THE CONTEXT OF GLOBAL CHANGE**

The literature on climate change often speaks about the adaptabilities and vulnerabilities of northern communities. Rural, remote and resource-based economies are sensitive to global changes, economic as well as environmental. Housing, education and health care infrastructure and services are examples of areas where adequate systems are lacking. Vulnerabilities result from population shifts and dependence on a local tax base for service provision. Northern communities may be even more vulnerable, since they lack access to services and markets external to the local community. We are seeing the urbanization of some northern cities, which were at one time villages, but these cities are not sustainable beyond the cash economies created by natural resource booms (e.g. staples trap).

What is often undervalued in the discussions about impacts and adaptations to global change is a complete understanding of traditional economies, which were closed systems dependent on local resources. Placed in a modern context, traditional economies are not entirely closed systems. There exists a balance between import/export of goods and services (i.e., movement of people). To replace a local, sustainable capacity with import of new types of capacity to adapt and address vulnerabilities that may be exposed by global change is a paradox. For example, in traditional economies, the value of traditional/country foods go beyond simple food; ‘traditional foods can also provide protection against many diseases that are prevalent among southern populations. Environmental influences on the availability of and access to these important sources of food present the risk of losing these beneficial factors as well’ (Dickson 2003). If local food is replaced with imported food, the latter are often the lowest quality: highest in saturated fats, preservatives, etc. Van Oostdam (*et al.* 2003) noted ‘traditional/country food is an integral component of good health among Aboriginal peoples. The social, cultural, spiritual, nutritional and economic benefits of these foods must be considered in concert with the risks of exposure to environmental contaminants through their consumption of traditional/country foods.’

**CONCLUSIONS**

In the preface to the Arctic Monitoring Assessment Programme (2002), the Indigenous Peoples Secretariat of the Arctic Council, included a statement prepared for the Permanent Participants, who called on ‘the nations of the world to increase efforts to develop international instruments to deal with the effects of mercury and other heavy metals that threaten the human and environmental health of the Arctic and the world.’

Dickson (2003) notes ‘the effects of climate change in the north on indigenous peoples’ ability to locate and procure these physically, social, culturally, mentally and economically important food sources are not simply predictions for the future, they are a reality in many communities today. However, the extent of these impacts
and their implications for the nutritional well-being of individuals and communities is not yet well understood.' More research is needed on food security and on climate change—research that engages Indigenous communities in coordination with regional/national and international processes. The engagement must meet the tests of respectful and responsible research, beyond the ethical reviews of universities and colleges far removed from the peoples and lands under scrutiny. Ultimately our success in understanding the resilient north will depend on how well we apply traditional knowledge alongside and equally with western science.

Changes brought about by climate variables and the impacts these changes have on communities are being reported and documented in some northern regions (for example ACIA). The Dene and other Athabaskans, Inuit, Metis, Sami, Aleutians, Russian Indigenous Peoples, are contributing case studies from domestic programs. For example the Dene had the Denendeh Environmental Working Group, funded by Environment Canada under the Northern Ecosystem Initiative. Climate change observations and views in the north are being included in the Arctic Climate Impact Assessment Report. Moreover, climate change is being lived in the circumpolar north and Indigenous Peoples are talking about the changes they are seeing in the land. They are again turning to scientists, the south and the international world to halt what is fast becoming a losing battle. The challenge for southern and northern peoples will be to ascertain the relationship between these changes, experienced as they are as pressures on local food security, and to work collectively to develop appropriate adaptation responses and strategies. Ultimately the objective is to minimize risks and take advantage of any opportunities these changes create for the future.

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Arctic Food Security


Conclusion

The State of Food Security in the Circumpolar Arctic

Gérard DUHAIME and Nick BERNARD

Relative Food Security

Contributors to this volume have shown that factors involved in food security in the circumpolar region are multiple, and that the extent to which they overlap varies considerably from one region to the next. We conclude this treatise with a holistic assessment that will allow us to go beyond characteristics of local situations and highlight the specific weight of those factors that the conceptual approach of the project has allowed the research team to explore. At the same time, we aim to provide answers to the most general questions that prompted this research. To do this, we take a step back from the thematic-, geographical-, or discipline-based perspective to a more holistic approach to illustrate how each component articulates as a food, and as a social system.

We hypothesized that food security reflects a situation of balance between food needs and a system’s resources, whereas food insecurity occurs when the balance between needs and resources has been upset. In both cases, the qualification is relative when there is little resistance to fluctuations in the components of the food system and to the tensions between them; under such conditions, the food system tends to develop adaptations. Adaptations may serve to improve the operation of the system as a whole, but they may also cause the system to deteriorate.

If our partial analyses (thematic and regional) are sufficient to draw valid conclusions, everything would indicate that the Arctic, in general, is characterized by relative food security. Almost all of the regions studied showed significant real or potential fluctuations in certain important areas. They also reveal a generally low resistance to fluctuations, expressed by adaptations of the food system, which leads, in the most extreme cases, to a state of systemic insecurity. While these findings warrant explanation, they nevertheless support the statement that, in the context of the five years of this research, the Arctic has experienced neither a state of lasting food security or of chronic food insecurity.

Factors of the Social System

The issue of contamination in Arctic environments was among the most urgent questions that led to the research. When this program began, the discovery of the presence of contaminants transported into the Arctic region was still recent—so recent in fact, that the impacts on the food system, on human health, and on economic activity were still not known. A great number of studies have since been conducted, which has considerably improved the current state of our knowledge.
Research on the state of the environment has not eased concerns; instead, they have highlighted the extent of contaminant loads in the Arctic and in circulation throughout the region, most notably through the food chain, with human consumption at the top end of this chain. The perspective from which these studies were carried out made it so that no other conclusions were possible. That is, they did not aim to determine the general state of health of the environment, but rather they sought to describe the state of contamination. Geographical maps resulting from such studies only added to fears; they identify zones of contaminant concentration, the most contaminated animal species, the organs or tissues of species in which concentrations are highest or that present potential risks for human consumption, and so on. Moreover, newspapers regularly publish headlines dealing with animal deformities, even though these deformities cannot be directly attributed to the effects of contamination or other factors.

What these studies and headlines fail to indicate is that the Arctic is a healthy environment; that the animals are generally in good health, and that including these animals in the diet does not present risks from a food production and consumption standpoint. As Chapter 2 of this volume attests, there is no clear relationship between the presence of contaminants and the food safety of game and human health. Similarly, the incidence of zoonotic disease is considered low, or is poorly documented. Research continues in these areas.

The variance in factors that are essential for food security, both in empirical reality (whether well or poorly documented) and in the perceptions that society has of reality, have tangible effects on the behaviour of participants in the Arctic food system. For example, a combination of facts and perceptions can lead public health authorities to make recommendations to residents to, for example, avoid or reduce their consumption of certain parts of animals they harvest and increase the consumption of others. This might lead hunters to stop harvesting certain species out of fear of being poisoned, or spend a portion of their budget for hunting and fishing to purchase industrial food products. Some contributors to this volume have shown the effects of such adaptations. The decline in consumption of wild species deprives individuals of the protective effects of certain elements in these foods (e.g., against cardiovascular disease), and adds to hunting pressure on other species, while an increase in the consumption of industrial food raises the risks of developing other pathologies (e.g., obesity), and places a burden on other components of the household budget.

These effects correspond to what has been described theoretically as fluctuations in the food system that lead to adaptations precisely because the system as a whole offers little resistance to change. The question of environmental contamination is complex in and of itself because it cannot be adequately defined without considering its various dimensions: chemical, biological, geographical, climatic, economic, political and international, etc. The complexity is such that local actions seem insignificant, and organizations such as the Inuit Circumpolar Conference are bringing the issue to the attention of the world through international forums. The complexity reveals the inability of the food system to resolve this problem and, consequently, explains the adaptations made as a result. This corresponds, in turn, to what we theoretically describe as the system’s low resistance to this type of fluctuation. A strong resistance would imply that the problem could be
resolved ‘automatically,’ much like when a consumer chooses a similar product when a preferred brand is no longer available. Clearly, this is not the case here.

What we found in research into contamination, we also found in other fundamental areas of food security, in particular in those that have an immediate influence on the harvesting of local food resources. In fact, in all of the regions of research, restrictions on the harvesting of wild resources for food purposes leads residents to alter their food practices.

There are many such restrictions, and these are occasionally linked to environmental factors. For example, access to species whose distribution is disrupted by climate change promotes a shift of the hunting effort to more readily available species. Restrictions can also be politically motivated; very often, regulations are geared to conservation. In Northern Greenland, the ban on snowmobiles as hunting vehicles seeks to mitigate environmental impacts and promote the continuance of traditional practices such as the use of dogsleds. Quotas imposed on harvests of limited species, for example the beluga in Canada and the bowhead whale in Alaska, are transforming the customary use of these species. Similarly, fishing quotas alter industrial practices by promoting, in Greenland for example, the conversion of the industry toward the harvesting of more abundant species. But political limitations on the harvesting of resources may have goals other than conservation. In Alaska, for example, access to land mammals is limited by regulations originating from two levels of government that introduce all sorts of complexity into hunting practice, depending on whether the animals sought are found on federal or state lands. Basically, these regulations are designed to favour rural residents of the entire State. According to the Inupiat, they introduce undue competition between the customary food practices of aboriginals and the practices of other ‘rural residents.’ Government intervention occasionally promotes the industrial exploitation of a territory’s resources to the detriment of small-scale harvesting of food resources; such is the case for reindeer herding. For example, in Northern Finland, the Sami are forced to compete with the logging industry for the exploitation of the territory; in the northern part of the Russian Federation, the Nenets have witnessed the destruction of their traditional grazing lands as a result of gas and oil exploration. Restrictions can also be in the form of economic barriers. The high cost of living in the Arctic, notably the high price of equipment and fuel, can impede the pursuit of traditional activities, in particular among the less wealthy. Yet, the high price of commercial food should promote the pursuit of customary food production practices.

As described, these restrictions prompt residents to alter their day-to-day practices. But we also observed that they lead to collective action, often of a political nature, to alleviate or lift these restrictions. This is true at the local and regional level when aboriginal associations demand regulatory amendments or territorial rights. It is also true at the international level when, for example, the permanent participants of the Arctic Council call for the concerted action of member states to curb environmental contamination, the destruction of the ozone layer, or causes of global warming. These representations are addressing complex questions and rarely lead to immediate changes in the basic conditions they seek to remedy. The results show how difficult it is to influence the basic conditions of food security, as if the force of inertia of the natural and social systems were being exerted upon them. In the meantime, residents react by immediately changing what they are able to change, which most often is supply, production and consumption practices, a point to which
we will return. The weight of basic conditions imposes a low resistance on the food system as a whole, given that the system does not address these restrictions but rather adapts to them. Moreover, this adaptive process, which takes place downstream from the origins of the conditions, does not upset the balance between resources available to achieve food security according to food needs: it modifies this balance. At least, that is what we were able to observe in those areas where we carried out our work, and which confirms the assessment of relative food security.

**SUPPLY MECHANISMS**

While some of the basic conditions of food security would lead us to believe that, on a global scale, Arctic food security is relative, does this hold true for supply mechanisms? In all of the regions of our research, we were able to determine that the two main supply mechanisms—market and traditional—are operational.

Market food production and circulation occurs everywhere. In most regions, food obtained from local resources and intended for the domestic market is of little importance; this is particularly true in North America, where there is limited commercialization of local resources. In Canada, and in Nunavik in particular, commercialization of local resources is further inhibited by complex regulatory constraints and by the difficulty of organizing the harvesting of wild caribou herds in an effective and profitable manner, based on an industrial model. In Greenland and in Northern Scandinavia, however, this type of commercial production is commonplace. The production of resources for export is remarkable in Greenland, but these activities contribute to domestic food security only indirectly, in that they produce revenues that are partially re-invested in the economy.

Market circulation is based overwhelmingly on the import of supplies from outside Arctic regions, carried out mainly by private agents in the transportation and wholesaling/retailing branches. Commercial operations are of major importance for the food security balance of Arctic residents as they provide the lion’s share of products for consumption. This proportion varies from one region to the next, and has varied greatly over time in certain regions, such as in the far eastern part of Russia where entire communities, cut off from the rest of the world in the early 1990s, had to increase their consumption of domestic reindeer in order to survive. These situations of food insecurity have since largely dissipated, at the price of vast demographic and economic reorganization following the dissolution of the Soviet Union and the creation of the Russian Federation. During this period, entire villages were closed and collective breeding enterprises were privatized or simply disappeared.

What is perhaps most surprising about market operations is their fragmented nature. As Chapter 8 illustrates, markets involve multiple stakeholders organized in relatively flexible logistical systems and for whom a common motive is the search for profit. The organization of the market is not based on any centralized planning, for example within a state-run organization, where the mission is to ensure the sustainability of operations. The supply chains are sometimes long and complex, and breaks in the chains are not uncommon. A sudden bankruptcy experienced in one link (wholesaler, carrier, distributor, or retailer) or an interruption in operations for any number of reasons (suppliers’ inability to fill orders, harsh weather conditions or technical problems with transport, the destruction of a retail business by fire) could
lead to out-of-stock situations, even shortages. Events of this nature do occur. But generally, the supply chains seem to work and, when they break down, they are re-established as a result of adaptations that occasionally involve the intervention of public authorities. The risks, coupled with other factors such as harsh climates, large distances, and small consumer base in each community, lead to high unit costs.

While the markets do work, they are never pure or perfect, as an economist would say. Indeed, in almost all observed cases, market operations were impacted by government interventions. Far downstream on the supply chain, imported food production is subject to various regulations concerning food safety, product labeling and so on. In the Arctic itself, where this regulatory regime prevails, procuring imported food supplies is sometimes encouraged. Various programs help lower consumer prices in the Canadian North, or standardize prices from one community to the next in Greenland. These government interventions are periodically called into question, especially when public authorities doubt the effectiveness of state intervention and prefer to give market forces free reign. This adversity leads to new adaptations, made as individuals when a consumer modifies the allocation of their food budget, and collectively when local associations or administrations organize to defend existing programs.

Non-market mechanisms also contribute to the food supply chain. Traditional or customary production exists everywhere. The project team did not attempt, however, to measure the importance of this production quantitatively. Observations, such as those presented in Chapter 4, indicate that customary production is very widespread in the aboriginal population.

Food harvesting undertaken by way of customary hunting, fishing and gathering and the redistribution of the proceeds of harvests through informal networks are commonplace realities in the aboriginal population. Remarkably, several observations converged and allowed the research team to establish a link between monetary income and customary production. It is not unusual to find that the most productive households are those with high monetary incomes. Furthermore, households enjoying high disposable incomes contribute financially to the production of less solvent and, more often than not, related households. This link between formal income and informal production also takes on another aspect: less wealthy households, such as single-parent families headed by a woman, experience the most difficult time obtaining regular access to traditional foods. If this is true, as everything seems to indicate, this research confirms the findings of earlier studies that highlighted a close overlap of these two economic systems.

This overlapping, or ‘mixed economy,’ in which monetary income supports customary production, also operates in the reverse in some regions, and extends beyond the domestic sphere. In these regions, food production lends itself to redistribution through formal channels. In almost all Arctic regions, a portion of the game harvested is sold in trade. The degree of organization and regularity of these operations is highly variable. In Greenland, for example, this trade has developed such that producers, who retain a portion of their harvest for their own consumption, can count on an instituted and regulated market. A very different situation exists in the Canadian North, where the sale of game is relatively limited and only contributes incidently to supply. This apposition also takes another formal channel in several regions. In Alaska and in Nunavik for example, some hunters are remunerated by the
This mixed economy is a reality characteristic of the Arctic. But its scope, which varies greatly according to the regions, is enigmatic at first glance. Why is the commercialization of game so common in Greenland for example, but so rare in Alaska? Why have traditional production and circulation remained so commonplace in regions that are so well supplied with imported food products, such as in the Canadian North? The belief is that these adaptations result from preconditions of the basic food system—in particular by economic, political and cultural factors.

In the everyday discourse, the importance of customary practices is commonly attributed to the perpetuation of tradition—motives that give households good reason to devote part of their resources, time, labour and money to food production. The monetary resources are relatively important. A bowhead whale hunting expedition is very costly, just as is the purchase and upkeep of a snowmobile, a motorized canoe, or maintenance of a pack of dogs for sledding, etc. However, an analysis of the household budget shows that the value of production makes up for the resources invested and that if equivalent food products had to be acquired on formal markets, the costs would be far greater. In everyday practice, subsistence is justified from the standpoint of economic rationality. Whereas resorting to traditional practices is justified by cultural considerations, in actual practice it is seen as an adaptation to prevailing economic conditions. In an environment where the price of food baskets is high, where food resources are available for harvest, and where the know-how exists to conduct this harvest, food production is an appropriate way to limit expenditures and balance the household budget. In short, while we agree with the assessment that Aboriginal communities in the Arctic are characterized by a mixed economy, we disagree with the notion that it exists for purely cultural reasons. This phenomenon is also based on an economic reality, whereby households are faced with economic constraints to which they are not insensitive.

The importance attributed to culture is understandable. Social representations place a high value on game as authentic food, which defines, at least in part, the aboriginal condition. On the other hand, such representations place little value on industrial food which, in a most far-reaching expression, perverts aboriginal identity. Yet we found a significant disconnect between these representations and the reality. While imported food products are given less value, they nevertheless account for the lion’s share of consumption; local foods represent a very large proportion of protein intake but represent only a small portion of total consumption. By emphasizing vernacular practices and their representations in the general discourse, commentators have neglected to realistically account for the importance (quantitatively) of these practices in overall consumption, and instead perpetuate a common misconception about a current aboriginal reality.

If we accept the conclusions presented in Chapter 6, the continuation of traditional practices in Greenland is based less on ethnic identity than on the desire to consume choice food. The commercialization of game has increased access to such resources, adapting the food system to consumer preferences. Yet this arouses suspicion in other Arctic regions, particularly among the Iñupiat of Alaska, or whom this type of commercialization is imminently limited, and where the role of traditional practices in identity formation is very strong.
Alaska’s situation also represents an adaptation that can be explained by the configuration of the basic conditions of the food system. For decades, public authorities have been measuring traditional harvests with unequalled precision. While these harvests are largely justified in everyday life for the role they play in ethnic identity, they are also economically important for the household. The resistance to commercialize game (as was publicly debated at a workshop held in Kotzebue), still recognizes the fact that such a practice could increase the availability of products for consumption. However, the argument for commercialization is outmatched by a fear that it will limit access to game for traditional use—a fear based on an absence of rights reserved for aboriginal resource use. As noted earlier, for all intents and purposes, aboriginal people in Alaska do not have rights of access or harvesting rights that differ from those of other ‘rural residents.’ Clearly, there is a fear that commercialization will pave the way for massive exploitation of animal resources (as was the case for the harvesting of salmon in the southern part of the State for over a century), and that by establishing competition for resources, commercialization will limit the potential for customary harvesting. From this vantage point, identity serves as an ideological foundation for a claim that has important economic dimensions. Unlike Greenlanders, the Iñupiat do not benefit from political autonomy that would allow them to establish a framework for eventual commercialization based on their own vision of the world. The state of food supply mechanisms based on the use of local resources is explained in terms of specific adaptations to regional contexts.

While we have very limited data on this issue, we can say with some certainty that non-aboriginal residents of the Arctic resort to non-market mechanisms to varying degrees, according to whether they are permanent or temporary residents and according to conditions that vary from one region to the next. Rural residents of Alaska undertake harvesting which, as mentioned earlier, fuels the fears of aboriginal people with regard to commercialization. The settlers of Labrador follow production and circulation practices that are very similar to those of the aboriginal people of the region. Harvesting is also practiced in Russia and is similar to that of aboriginal people, at least in some respects, in particular the harvesting of mushrooms, wild berries, and home gardening activities. As for non-permanent residents, harvests are much more limited, particularly owing to restrictive regulatory frameworks.

The supply mechanisms studied exclude illegal transactions, as such research would present major issues of ethics and methodology in particular, and would have diverted attention from the more urgent questions at hand. In the course of this research, some extraordinary events surfaced that would undoubtedly warrant empirical validation. As an example, and without going into details for obvious reasons: In a small village in northern Russia, aboriginal reindeer herders spoke of a situation that was, in their words, catastrophic. Not only had their grazing lands been gradually destroyed by industrial pollution, their herds were occasionally attacked by soldiers seeking to improve their food rations, a situation against which these herders were absolutely powerless. It can be said that in this specific context, the food system offered little if any resistance to illegal behaviour, and that herders were forced to adapt by assuming the losses or if possible, by taking steps to obtain compensation. Food insecurity in this situation, where the supply mechanism has been jeopardized by the domination of big industry and by the uncontrolled, albeit
limited actions allegedly committed by public authorities which, were they to occur with regularity, could risk undermining the balance between resources and needs.

**AVAILABILITY, ACCESSIBILITY, AND CONSUMPTION**

For food security to exist, resources must be available and accessible. Availability is provided by the food system, whereby supplies—whether from market or customary sources—are placed at the disposal of consumers. Availability is determined by numerous factors upstream, and measured by the ability of food and service producers to geographically reach those individuals whose needs they wish to meet. As for accessibility, it is the material and financial capacity of an individual to acquire the available supply. Conditions of availability and accessibility must both be present, although they may be only partial. For example, available food supplies may not be economically accessible and/or accessible supplies may not be sufficient to satisfy all food needs or preferences.

In all observed regions, there seemed at times to be marked differences in availability, depending on geographical location. Population ‘hubs’ that are linked to a regional road network or to more southern urbanized areas by regular air cargo flights benefit from greater availability than do other communities. In these populated centres, imported supplies are more varied, abundant and fresh than they are in more remote areas, where supplies must pass through regional transshipment links or smaller communities that have less frequent scheduled flights. Moreover, the larger centres often have several commercial outlets that may stock different and complementary supplies, as well as a selection of restaurant establishments. Smaller settlements and communities in outlying regions are often serviced by a single retail outlet, creating a monopoly situation that does not necessarily promote optimum availability. If, as everything indicates, the market is the main organizer of food supply, a monopoly benefits producers more than consumers. In certain Arctic regions, this situation is offset by special practices. For example, high wage earners, or those who receive benefits from their employer to offset the high cost of living or geographical isolation, circumvent the problem by placing food orders directly with suppliers located outside the Arctic. Transportation costs are paid by their employers. Although these strategies increase the availability and accessibility of food, they also clearly penalize local businesses that do not benefit from this clientele, and accentuate social disparities.

The availability of products obtained from traditional activities that do not circulate in retail markets is governed by multiple social factors. Large family and community networks operate according to rules that involve voluntarily negotiated reciprocal obligations; that is, a logic of donations and counter-donations. While very widespread, these sharing systems are not universal or open to everyone equally. Some segments of the population do not benefit from this availability, such as single-parent families headed by a woman, or recently arrived families that are not part of sharing networks. The intervention of the state or non-governmental organizations (i.e., charitable associations) compensates somewhat for gaps in the system, but it is difficult to draw general conclusions as to their real scope. In summary, while the availability of food is generally ensured, availability is unequal, and varies according to characteristics of the population centres and segments. As a result, the system does
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not meet food needs perfectly, a situation that once again confirms that food security is relatively stable when the Arctic is considered as a whole.

In the Arctic, material accessibility continues to present problems. Supply centres are occasionally located at a distance from the places of residence or from hunting or travel routes. But the most widespread barrier to accessibility is economic. It has already been shown that consumer costs are very high in the Arctic. The income structure does not necessarily reflect disparities between the Arctic and areas outside. In all observed regions, there are professionals who enjoy significantly higher employment income, either because the profession has high social or economic value (for example, physicians in North America, senior-level managers in the extractive industries in Russia) or because they are employed in lucrative industries (for example mining, gas and oil extraction, seasonal construction). In such cases, high prices are not necessarily a barrier to access to food supplies. But in the same regions there are also wage earners whose income is not higher simply because they work in the Arctic. Incomes for large sectors of the population are about average; for others, dependent on contract, temporary work, or social transfers, incomes border on poverty levels, as shown in Chapter 5 of this volume and in several studies conducted throughout the Arctic. Based on the current state of our knowledge, the extent of these strata cannot be quantified, but from a quantitative standpoint, they are important. If this is true, one of the largest obstacles to accessibility of food supplies, and hence food security, is limited monetary income.

Sometimes, the barriers to availability and accessibility combine to create true situations of food insecurity. Research dealing with the far eastern part of Russia in the period following break-up of the Soviet Union and until the mid-1990s identifies such situations. As described in Chapter 11, improvements have been made in some of these regions; for example, commercial supply has improved. However, despite these efforts, the supply system is still very rudimentary in the most remote regions, and prices remain very high. This type of situation is not exclusive to Russia, but neither is it sufficient to generalize such situations.

CONCLUSION

The aim of this program was to find answers to some broad questions of food security. In this final section, we endeavour to address each of these questions, based on the results of the research undertaken.

What is the importance of each of the basic conditions of food security; that is, those factors that have a decisive impact on supply mechanisms, availability, accessibility and food consumption? Environmental factors carry considerable weight. The presence of contaminants at various points in the food chain require adaptations to traditional food procurement practices, and the promotion of consumption of imported products as substitutes when the supply and economic capacities of the households so permit. The impacts of global warming have also necessitated certain adaptations. However, there is little empirical data to support this statement. In terms of customary or traditional production, global warming will inevitably lead to changes in practices as a result of changes to the physical environment and, subsequently, the distribution of species sought for harvest. In terms of market production, we can but speculate by this research that the
commercial system will try to preserve its markets and to find adaptive solutions with this objective in mind.

Demographic factors have a marked impact on the entire food system. Population growth, which characterizes several regions, exerts major pressures on the food system, particularly when this growth is rapid, as is the case in North America in particular. Population growth adds to the demand for food supplies that cannot be met adequately by customary production and, as a result, the necessary monetary income required to purchase food products in stores is accentuated. The rapid transformation of aboriginal peoples’ lifestyles is marked in several regions by recent sedentarization, demographic explosion, and changes in dietary patterns. Vernacular consumption patterns show incremental use of imported products, such that the latter now represent the greater proportion of the diet, which has resulted in an imbalance in food intake. This increased dependence on imported foods might explain the increased prevalence of related diseases such as obesity and diabetes, which until recently had been encountered only exceptionally at Arctic latitudes.

Technological factors have profoundly modified the Arctic landscape. Technology has multiplied the communication and distribution systems on which imported supply networks are structured, and have increased the productivity of customary supply activities. At the same time, it has contributed to the establishment and growth of the market economy, which has become an essential component of the food system.

The central importance of economic factors is undeniable. The integration of the Arctic in the world economy has led to the disappearance of an essentially autarchic situation. Arctic residents now share consumption patterns with the rest of the world governed by a market economy. Currency, wage labour, private enterprise, investment, etc. are economic realities that have penetrated the entire region and food security is configured accordingly. Moreover, this has led to the development of, or at the very least increased the levels of, social differentiation in that economic wealth is not distributed equally. Access to the food supply, whether from market or customary sources, is largely determined by the economic capacity of individuals and households.

The integration of all Arctic regions in the political system of metropolises has been achieved. Only Iceland has maintained political autonomy; all other Arctic regions are more or less severely limited in their ability to introduce relevant social policy. This situation is perceived as restrictive by northern residents, especially when particular laws and regulations discourage traditional activities and place them in a disadvantaged position relative to large-scale businesses, or when standards are imposed that are difficult to apply to food production. However, including the Arctic regions in the global political economy also offers advantages for food security, in that it allows communities to benefit from national transportation, communication and trade networks that contribute to the regular supply of imported food products and equipment used in local food production. At the same time, political autonomy would undoubtedly not exclude the Arctic regions from such international conventions as those promoting biodiversity and the protection of threatened species, or from international political and economic trends, such as the widespread current advocating free trade.

Finally, cultural factors exert a marked influence on the food system, although, like culture itself, this influence is not univocal. Culture is built of
representations that give meaning to the world—a dynamic universe that is continually reinvented to reflect a world which itself is in a constant state of transformation. In the Arctic, the resources of the vernacular culture continue to be relevant. In the food system, they help perpetuate knowledge systems and ways of seeing things that contribute to the maintenance of customary activities and, by extension, to the food supply. They also represent the meaning of these practices: they give value to customary practices through their association with identity-based authenticity. But culture is also founded on common practices. Although the consumption of imported foods does not often figure in the aboriginal discourse, it is widely evident in practice and permeates daily life. This might be explained by the fact that the original components of aboriginal cultures, including dietary practices, constitute a basis for self-government claims. Furthermore, this insistence on inherited practices, which is not inclusive of all practices, is all the more persistent in those regions where the very existence of aboriginal groups is threatened or where the degree of political organization of aboriginal people is most advanced. Finally, the perpetuation of inherited practices might provide a mechanism to compensate for ruptures in commercial systems, which are highly dependent on complex transaction chains. For this to happen, these traditional food procurement systems must continue to exist in practice. A significant portion of local food is still derived from non-market production, and based on ancestral practices. Nevertheless, the insurgence of capitalism has effectively undermined the structure and has called into question the value of traditional practices that decline when households turn to market production or salaried work.

Taken in this context, in what ways has the social system addressed the issue of food supply? On a global scale, there are three documented ways by which this issue has been resolved, to a certain degree at least. First, the implementation of market logistics and private investment in the same represents a possible extension of the market economy. Second, state interventions provide a framework for supply mechanisms (market and customary) that compensate for the most unacceptable inadequacies from a political standpoint. Finally, at the household level, the decision is often made to allocate a portion of the income to purchase imported industrial food and another portion to support traditional food procurement practices—a decision based both on economic rationality and culturalistic ideology. But these mechanisms are far from perfect; supply inequities continue to exist, as we examine later in this chapter. Supply is insufficient to maintain a balance between resources and needs and consequently, to ensure food security.

We have maintained throughout this volume that in the Arctic, the situation is generally one of relative food security, given that resources and needs are relatively in balance as a result of adaptations to fluctuations in supply, to which the food system is less able to respond. This assessment applies at a global as well as a regional level in the surveys undertaken. Where it was necessary to consider regional realities and take into account temporal variations, major nuances had to be formulated. As mentioned earlier, the idea of systematically extending this work to Northern Russia (even though it would have been desirable to do so, because this region would prove most problematic) was abandoned. However, collaborators who joined in the research at various stages, whose main area of expertise is the Russian regions, provided an additional perspective that takes full meaning in this volume, in particular when added to the contributions of increasingly abundant scientific
literature. In Far-East Russia, and in other western regions where poverty is most blatant, relative food insecurity reached a peak in the years immediately following the break-up of the USSR. This state of relative insecurity has been dissipated only as a result and at the cost of major adaptations that included massive immigration (affecting not only isolated villages but also such urban areas as the Murmansk Oblast) and private reorganization of animal breeding and food distribution networks. These examples demonstrate that food security is most in jeopardy in those regions that are, collectively, the poorest. The poverty evident in certain regions is not the result of random chance. As has been demonstrated several times, the Arctic is still globally considered as an immense reservoir of natural resources to be exploited to meet the insatiable mass production and consumption needs of the world’s most developed areas. In the world economy, those regions with exportable natural resources, especially resources of marked economic or strategic interest (such as oil, gas and base metals), experience a certain prosperity. But such resources are not equally distributed across the circum-Arctic; several regions have none. In reality, vast segments of the population of certain regions live in a state of insecurity, since the balance between needs and available resources must be adjusted by continuous adaptations.

One of the most important nuances in this general assessment of relative security relates to the level at which observations are made. The conceptual approach of this study presumed that research would include observations at the international, national, regional, household, and individual levels, and analyses of the relationships between these levels. However, the research program did not benefit from unlimited resources, which, at least in theory, would have allowed more comprehensive observations and systematic analyses to be made. Despite these clear limitations, one of the most significant observations is that throughout the Arctic, generalizations cannot be made regarding food security issues geographically. Some of the research highlighted the fact that access to food resources is most often limited by economic barriers. In several Arctic regions, the unequal distribution of wealth only seems to add to the disparities. Statistical averages provide little insight into economic stratification in Arctic regions and, to date, few studies identify or provide information on the scope of these alleged gaps. It is hypothesized that in each region and community, a significant portion of the population experiences a certain degree of food insecurity because of insufficient income to have, at all times, access to sufficient, healthy, and nutritional food to meet energy needs and satisfy food preferences in order to lead a healthy and active life. It can be stated that this applies not only to the poorest, but also to the richest regions. Indeed, the wealth created by extractive industries in even the most prosperous regions is not necessarily distributed equally among the residents for the sole reason that they live in these regions. In fact, there are numerous cases where the economic spin-off and advantages benefit but a small minority of the surrounding population. The establishment of local food supply systems for the needy and the advent of food banks in some regions of the North American Arctic tend to confirm this view.

We believe that the conceptual framework that guided these investigations remains valid, and could be used for further research, and to report on the real situation of food security in the Arctic. However, certain aspects could be modified to increase the relevance of subsequent work, such as various factors based on political or geographical divisions, and on differences between the social strata of a
Conclusion: The State of Food Security in the Circumpolar Arctic

given region. Breakthroughs are expected in research. A major initiative running concurrently with this program—SLiCA (Survey of Living Conditions in the Arctic)—is documenting the basic parameters of living conditions of aboriginal populations of the Arctic. To date, new data has been collected for the Inupiat of Alaska, the Inuit of the Canadian Arctic, Greenlanders, the Sami of Northern Scandinavia and Russia, and the Chukchi of Siberia. These data will make comparative analyses possible that should help fill some of the gaps identified in this study; namely, provide empirical data on living conditions, including the food situation, relative to the position of individuals and households in the social stratification.

In the incessant search to ensure the reproduction of life, can any of the determinants, such as the economic organization of society, be manipulated so as to render a precarious search for food into food security? In other words, can residents of the Arctic do anything other than adapt to conditions that determine the state of food security? The question is a difficult one and, in reality, there is little empirical evidence to provide clear-cut answers. Using the foundations of social action, the observations made during this research provide a basis for a plausible answer. Behaviour modification (adaptation) can be used to reset the balance between food resources and food needs, which presupposes that individuals consider the situation as status quo—a more or less unavoidable constraint to which it is better to adapt than run the risk of food insecurity. Numerous adaptive responses, in particular within the population, are evident—such as changes in traditional food procurement practices to avert the dangers associated with environmental contamination or to comply with regulatory frameworks, and/or changes in the allocation of the family budget to accommodate the growing need for imported products. At the level of the individual, response possibilities seem to be more often than not limited to adaptive actions, due to the weight of the social institutions, against which individuals seem powerless. Yet there is evidence that adaptive responses are not the only possibilities.

Political action is one of the means by which residents might influence certain determinants of food security. The Inuit Circumpolar Conference, for example, seeks to influence international policies in order to curb trans-border contamination and the thinning of the ozone layer, phenomena which affect the various Arctic regions. Such political actions envisage a collective means of dealing with problems affecting all individuals that could, in turn, have effects on the basic factors of food security—at least in theory.

Yet there are important limitations to such initiatives. Political action cannot be exercised efficiently in all contexts, as it presupposes certain basic conditions, such as freedom of expression and opinion, and a capacity to mobilize resources required for sustained representation (qualified personnel, adequate financial and technical means…). It also presupposes that other stakeholders will be open to considering input into decision-making. But, all these conditions are rarely guaranteed or appear simultaneously; they never occur spontaneously in a social system; at present political action lies in a dynamic between civil society, public authorities and private enterprise. In an era of neo-liberalism, nothing guarantees that the concerns of the public will be heard, considered, or acted upon in a satisfactory manner by private enterprise, without pressure from civil society or public authorities. Moreover, nothing guarantees that state intervention (driven by an ideological definition of the common good), will promote the concerns of civil
society over the search for profit (the motive of private enterprise), especially if profit is considered to be for the common good, as it seems to be in the current ideology.

Finally, what does the state of food supply systems tell us about the characteristics and operation of Arctic societies? What do the limits on the possibilities of feedback from civil society regarding the conditions of food security contribute on this subject? Arctic societies are not fundamentally different from others to which they are politically connected; in other words, they are less unique than the prevailing discourse would lead us believe. Indeed, they share multiple common characteristics. They are organized and regulated according to the dominant economic order and based on free enterprise. They are characterized by the freedom of the individual and on the arbitration of conflicting interests between business and civil society through political intervention. Generally, these elements combine to produce relative food security. In terms of geography, food security is jeopardized in those regions where economic interest is low, such as those lacking massive exportable natural resources. From a socioeconomic standpoint, it is threatened by limits of economic capacity—more specifically, poverty. It is not surprising that the most severe situations of food insecurity occur in regions that must be self-reliant, where social services and government intervention are very limited, and where the economically inferior strata of the population are the most widespread. Surprisingly, knowledge about the distribution of wealth in the Arctic is very limited. Clearly, additional research is required. Research on food security in the Arctic shows that, generally, relationships between businesses, governments and individuals do not differ from those observed in large population centres. Policies promoting economic liberalism are based on individual rights; the price of freedom is the obligation to find one’s place in the economy. Pure liberalism would require that government intervention be reduced to the most basic levels, and aboriginal populations of the Arctic, like those in large urban centres, must occasionally rely on representation to demand that public authorities maintain wealth redistribution measures in order to combat the most blatant poverty and inequities.

These conclusions contrast greatly with the picture of food insecurity in the world presented at the beginning of this volume by Charles H. Riemenschneider. The Arctic is no longer an area where people die from hunger. Nevertheless, the data show that a number of people periodically or regularly lack food in some regions, and the establishment of food banks and supply networks indicate that very real situations of food insecurity exist. These situations are not chronic, as described by Riemenschneider. However, for those individuals who are affected, they are no less real; they represent deprivation and exclusion that are all the more painful experiences in a world of relative abundance.
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List of Acronyms

ACIA—Arctic Climate Impact Assessment
AEWC—Alaska Eskimo Whaling Commission
AMAP—Arctic Monitoring Assessment Program
ANCSA—Alaska Native Claims Settlement Act
ANILCA—Alaska National Interest Lands Conservation Act

CAFF—Conservation of Arctic Flora and Fauna
CCAR—Canadian Arctic Contaminants Assessment Report
CINE—Centre for Indigenous Peoples’ Nutrition and Environment
COSWEWIC—Committee on the Status of Endangered Wildlife in Canada

DDT—Dichloro-Diphenyl-Trichloroethane
DFO—Department of Fisheries and Oceans (Canada)

EEZ—Exclusive Economic Zones
ESA—Endangered Species Act

FAO—Food and Agriculture Organization (FAO)

GEF—Global Environmental Facilities
GRT—Gross Registered Tons

HCH—Hexachlorocyclohexane

IASC—International Arctic Sciences Committee
IASSA—International Arctic Social Sciences Association
ICASS—International Association of Arctic Social Sciences
ICES—International Committee on Endangered Species
ICNAF—International Convention for the Northwest Atlantic Fisheries
ITQ—Individual Transferable Quota
IWC—International Whaling Commission

JBNQA—James Bay and Northern Quebec Agreement

KEAC—Kativik Environmental Advisory Committee
KGH—Kongelige Grønlandske Handel (Royal Danish Trading Company)
Arctic Food Security

LRTAP—Convention on Long-Range Transboundary Air Pollution

NPHS—National Population Health Survey

MARPOL—International Convention for the Prevention of Pollution from Ship
MBTA—Migratory Bird Treaty Act
MMPA—Marine Mammal Protection Act

NAFO—Northwest Atlantic Fisheries Organization
NAMMCO—North Atlantic Marine Mammal Commission
NMFS—National Marine Fisheries Service
NOAA—National Oceanic and Atmospheric Administration

PCB—Polychlorinated Biphenyl

POP—Persistent Organic Pollutants

RAIPON—Russian Association of Indigenous Peoples of the North

SHR—Saami Home Region

TAC—Total Allowable Catch


WCCD—World Commission on Culture and Development
WFS—World Food Summit
WHO—World Health Organization
PLATES

(POSTER PRESENTATIONS)
Environmental pollution introduces pollutants in the food chain that increase the contaminants body burden of Arctic residents. It may lead to the substitution of local food harvested from the land or produced through herding activities by imported foodstuffs. This situation may in turn lead to diet imbalances and food-related pathologies.

However, the issue of sustainable food security in the Arctic is not only linked with pollution problems. A global approach suggests that other factors are at play as well. The objective of the research was to present an integrated comprehensive diagnosis on sustainable food security for different Arctic regions.

Sustainable development

Sustainable food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Various factors of the social system shape the mechanisms of food supply. The mechanisms determine the accessibility and availability of foodstuffs for consumption purposes (figure 1). Interdisciplinary assessment of the interrelations between the social factors and the mechanisms of supply allows diagnosing to what extent sustainable food security is achieved.

Interdisciplinary Research Initiative

International and interdisciplinary research team, with contribution from social scientists, health scientists and jurists aiming at circumpolar comparisons;
- Food supply networks used as a central analytical tool (figure 2);
- Regional integration of results focused on key conditions threatening food access and availability;
- Transversal analysis of the results produced by individual and disciplinary projects for integrated diagnoses.

Results

Alaska

- Commercial food supply mechanisms are mainly based on the private sector, including fresh food supply air transportation. Profitability is low, as well as incentives for investments. The material availability of foodstuffs is therefore vulnerable to the decisions of numerous private actors;
- Environmental pollution related to oil and mineral exploitation and, to a lesser extent, military installations is less likely to affect customary food production, circulation and consumption than climate warming. Indeed, one of the most important risk factors seems to be linked with climate changes, which would modify migratory routes, species populations, seasonal cycles and territorial access;
- The major ongoing debate in Alaska does concern the legal regulating access to resources for Inupiat customary activities. Complexity of regulations enacted from multiple jurisdictions, and equivalent access right to resources regardless of ethnic origins are causes of social insecurity.

Canada

- Commercial food supply mechanisms rely on private initiatives for transportation and trade, although government programs subsidize transportation for specific food items. A growing dependence is observed regarding air cargos, making availability of foodstuffs vulnerable given the geographic remoteness, climate conditions, poor infrastructures and financial constraints;
- Economic inequities are obstacles to household food security. This situation is compensated by customary networks of self-help, and, to a lesser extent, by few food banks;
- Customary activities are highly practiced and pollution problems do not prevent local food consumption. The variety of available species allows a choice and a way to avoid contaminated species;
- Access to local food is limited by the absence of a commercialisation network, especially for those without resources to afford harvesting activities, disabled persons and the elderly. Subsidized programs aiming at the free distribution compensate for this situation.

Greenland

- Greenland is characterized by an efficient transport system, an extended food industry and a substantial commercialisation of local food, which contribute to the protection of the food security when compared to other Arctic regions;
- Economic inequities between households, towns and settlements, and between regions are visible and represent the main threat;
- Recent changes in the Home Rule economic policy towards privatization are jeopardizing the secured food supply mechanisms. This policy may lead to prices increase and disparities, which could raise barriers for economic access to foodstuffs.

Euro-Arctic Barents

- Competition between customary activities, especially reindeer herding, and massive industrial developments, such as oil and gas, forestry, mining and smelters operations, threatens sustainable food security. In the Russian region industrial developments produce massive air and soil pollution, and soil disturbances that destroy grazing areas;
- Competition for land uses is weakening customary food production activities and may threaten monetary incomes resulting from customary activities and decrease the access to commercial foodstuffs;
- The Russian region of the Barents is experiencing a long lasting economic turmoil that created a major food crisis. Remote regions are hardly supplied with manufactured food. In urban centres access to food production is largely restricted by inequities in incomes distribution;
- The decrease of wages and the increase of prices have created a situation where the average income is on the edge of poverty line. In such a context, gardening for vegetables and harvesting of wild berries and mushrooms are customary practices that are still viable.

Discussion

Environmental pollution is restricting the achievement of sustainable food security in the Arctic. The nature of pollution and the degree by which it affects the availability and the access of foodstuffs differ from one region to the other.

In regions where the distribution of wealth secures the economic access to food production and foodstuffs, and where supply mechanisms are well established, even based on free market, there are means to avoid lack of food, as well as contaminated foodstuffs from customary uses of local resources. However, in regions witnessing economic inequities instability, and supply problems, pollution is an aggravating factor that prevents the achievement of sustainable food security.

- In North America and Greenland, food security is relatively well guaranteed. The main risks are related to material availability and economic accessibility to resources and food consumption balance. The exception can be found in the Subarctic regions of the Euro-Arctic Barents region where the economic and environmental situation produces relative food insecurity. Nevertheless, a circumpolar examination suggests that sustainable food security is a fairly distant objective in all Arctic regions.

- The large part of food supply is produced by industrial unsustainable practices in southern regions, which in turn contribute to the pollution legacy that reaches the Arctic.

- Imporations generate few benefits for local communities, and to some extent, may contribute to prevent production, distribution and consumption of local food harvested from the land.

- Unsolved land use competition, and uses of land for massive exogenous industrial exploitation are additional impediments for a sustainable food security.

- Health problems resulting from food intake imbalances and from increased consumption of industrial food are trends that clearly lead to unsustainability.
Sustainable food security exists when every individual gets access to healthy, sufficient, and nutritious food, allowing him/her to fulfill his/her cognitive and adult performance indices as well as physical and healthy life. For the Inupiat, food security depends on the persistence of traditional activities based on the harvesting, for transformation, the sharing and the consumption of fish and game, often designated by the term ‘subsistence’. The perpetuation of these activities, however, faces many constraints such as greater competition for the access to resources and the exploitation of non-renewable resources. The law will contribute to food security by ensuring the access to fish and game. The legal protection of subsistence is thus an integral part of the global strategy aiming at ensuring Inupiat’s sustainable food security. To achieve this aim several new and existing traditional Inupiat activities are now under a given legal regime, it is necessary first to determine what would be the optimal legal framework pertaining to the protection of subsistence.

PROTECTING SUBSISTENCE: THE OPTIMAL LEGAL FRAMEWORK

First of all, the legal system should recognize a right of access to fish and game. Aboriginal peoples have never limited their hunting and harvesting rights, allowing such activities to get traditional food. This implies hunting and fishing rights as well as the right to share the harvested food using adequate norms of distribution. Next, the legal system should provide mechanisms for ensuring the participation of the local residents in the decision-making process regarding the management of resources.

In addition, the law should guarantee the right to access to land and harvesting rights allowing each Inupiat group to get traditional food. However, Aboriginal peoples have the exclusive right to access to fish and game for subsistence, which allows for the protection of subsistence resources. However, Aboriginal peoples have the exclusive right to access to fish and game for subsistence.

For the Inupiat, food security depends on the persistence of traditional activities based on the harvesting, the transformation, the sharing and the consumption of fish and game, often designated by the generic term ‘subsistence’.

ABORIGINAL PEOPLE HAVE THE EXCLUSIVE RIGHTS TO ACCESS TO LAND AND HARVESTING RIGHTS ALLOWING EACH INUPIAT GROUP TO GET TRADITIONAL FOOD.

RESULTS OF THE ALASKA RESEARCH

Several Sections of the legal regime represent a significant change to Inupiat’s sustainable food security. Subsistence hunting and fishing activities are regulated by the state of Alaska and the federal government as federal lands. In this context, subsistence activities are considered by the management regime sometimes as an important source of federal accountability.

On federal lands, representing approximately 6% of the state, subsistence hunting and fishing are particularly important for residents of rural areas. There is an ongoing debate over the management of subsistence hunting and fishing in these lands. Some reforms in traditional subsistence activities, such as hunting and fishing, have been observed in these lands.

The state of Alaska is currently engaged in the project of management of subsistence activities. The state of Alaska has the exclusive right to access to fish and game for subsistence. Subsistence hunting and fishing are considered as a significant source of federal accountability. However, Aboriginal peoples have the exclusive right to access to fish and game for subsistence.

Aboriginal hunting and fishing rights enjoying special status under the federal and state constitutions. As these rights are recognized by statute, they can be diminished or overridden by ordinary laws.

DISCUSSION

The legal regime governing Aboriginal subsistence hunting and fishing in Alaska does not meet the requirements of an optimal legal protection of subsistence and is therefore not fully compatible with the achievement of sustainable food security among Inupiat. Legal reform, however, is not simple and should take into account the existing socio-cultural situation in Alaska. The increasing number of groups that could provide the Inupiat with a more secure access to fish and game.

The Inupiat should have a greater say in the regulation and the supervision of hunting and fishing activities on public lands as well as on Aboriginal corporation lands, especially with respect to harvesting species, harvesting methods and season, setting up co-management mechanisms and granting local authorities, such as the North Slope Borough and the Arctic Borough, greater powers with regard to subsistence to be used in Inupiat control over issues that are critical to their sustainable food security.

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The legal regime governing Aboriginal subsistence hunting and fishing in Alaska does not meet the requirements of an optimal legal protection of subsistence and is therefore not fully compatible with the achievement of sustainable food security among Inupiat.
**HUNTING, FISHING, AND TRAPPING ACTIVITIES FOR SUBSISTENCE PURPOSES**

The Act sets out a list of activities, including fishing, hunting, and trapping, which are allowed for subsistence purposes. These activities are regulated by permit, and the permits are issued by the Nunavut Wildlife Management Board (NWMB). The NWMB is responsible for ensuring that these activities are conducted in a sustainable and responsible manner, and that they do not have a negative impact on the environment or the wildlife resources.

**DISCUSSION**

In conclusion, the Wildlife Act of Nunavut is an important piece of legislation that seeks to balance the needs of the Nunavut wildlife with the economic and cultural needs of the territory. The Act is designed to ensure that hunting, fishing, and trapping activities are conducted in a sustainable and responsible manner, and that they do not have a negative impact on the environment or the wildlife resources. The Act is a key component of the territory’s wildlife management strategy, and it is an essential tool for ensuring that Nunavut’s wildlife resources are managed in a sustainable and responsible manner.

**ACKNOWLEDGEMENTS**

The research program, Management Development for the Arctic, Coordination for Arctic Security, has been funded by the Social Sciences and Humanities Research Council of Canada through the Major Collaborative Research and Development Initiative. The author’s work was conducted at the Faculty of Law, University of Toronto, Toronto, Ontario, Canada.
Household food security is generally understood as the capacity of a household to procure a stable and sustainable basket of adequate food. Access to resources is an essential determinant of household food security. These resources include: food supply, income, technology, land and entitlements, credit, social network, etc.

- Food supply does not necessarily secure food access at the household level. Since a rural diet depends on imported food and technology to produce country food, access to cash is a factor of food security and insecurity in Nunavik. Income is associated with variations in nutrient intake.
- Access to sharing networks is another factor of food security in Nunavik.

Income as a factor of food security (Table 2)

- Respondents who tend to eat less as a strategy to cope with a shortage of resources also tend to come from households with a lower income.
- Respondents who tend to borrow money, go to community freezer and ask for food when short of resources also tend to come from households with a lower income.

Gender and food security (Table 3)

- Female heads seem not to deprive themselves from eating more than male heads do.
- Borrowing money, asking for money from housemates and going to the community freezer are strategies that are predominantly used by women.

The research project aims:

- To understand how households manage their resources;
- To assess the consequences related to the way households manage their resources in terms of food security.

More specifically, this study seeks to explore two of the conditions which contribute to the food security and insecurity of this household members:

- Access to monetary resources;
- Gender of the household heads.

Acknowledgement: I am grateful to all the Kuujjuaq women who have generously given their time for the study, to Diane Thibault and Daniel Tremblay for their useful comments and help to prepare this paper, and to Gérard Duhaime who had invited me to the Symposium.
INTRODUCTION

The sparsely populated and isolated regions of the Canadian Arctic are not exempt from environmental degradation. The destruction of the quality of the environment and its resources have negative impacts on local security of the inhabitants of the Nunavik region. They have to cope with the food chain and are overwhelmed with difficulties in the management of drinking water, liquid waste, domestic waste, hazardous materials, and mining wastes. Since the beginning of the early 1970s, environmental pollution and waste have been handled by the federal and provincial authorities to protect the environment and its resources on the whole territory. The James Bay and Northern Quebec Agreement, signed in 1975 by the Cree, Inuk, and Inuk communities and a sparsely populated region of environmental protection specifically applicable in Nunavik.

The CONTROL OF POLLUTION IN NUNAVIK

Regarding pollution, the measures and pollution control agreements must be adapted to Nunavik. In the case of Nunavik, all the responsibilities and pollution control agreements must be adapted to the Nunavik reality.

• It does not rely on the measures of pollution control, nor give powers to local authorities to properly regulate the consumption of the environment.

• Rather, it comes to the application in Nunavik of the general environment laws adopted by the Province of Canada and the Quebec National Assembly.

• The Agreement establishes a provincial strategy/voluntary initiative in charge of the planning of the application at the regional level in one of the main recommendations arising at existing the pollution control of the environmental laws and regulations.

• However, the federal and provincial authorities must ensure that the provincial Environment Agency, respecting the environmental laws and regulations.

• The James Bay and Northern Quebec Agreement are not adapted to Nunavik. The pollution control agreements must be adapted to the Nunavik reality. The pollution control agreements in Nunavik are not as effective as in all the other regions.
ENVIRONMENTAL ASSESSMENT AND PUBLIC PARTICIPATION IN NUNAVIK*

INTRODUCTION

Inspired by the desire to reconcile the economic development of Northern Quebec and the preservation of local cultural identity, the James Bay and Northern Quebec Agreement (JBNQA Agreement) has, in better or worse, explicitly recognized an environmental and social reality quite different from the one existing in Southern Quebec. To reconcile this, the agreement established specific procedures for environmental assessment: one for projects under pros-


tecution (including the twelve mining and exploration permits), another one for local, non-project and non-industrial projects; and a third one for all other projects. These three frameworks are described in Chapter 3 of the agreement.

ENVIROMENTAL ASSESSMENT

The environmental assessment is a fundamental tool for any economic development activity. The purpose of this type of administrative-sanction system is to make sure that the environmental impacts of a development project will be identified, evaluated and taken into consideration within the framework of the decision-making process. It is a planning and decision-making assistance tool intended to attenuate the negative effects of the development on the environment and the people. It fosters conflict avoidance between the vari-

ous users and users of environmental resources. The major objective of this mechanism is to provide a public participation in the process.

OBJECTIVE OF THE RESEARCH WORK

The purpose of our research work was to study, from a legal perspective, the environmental assessment procedure specifically applicable in Nunavik (Figure 1).

In principal, our main objective was to elaborate laws and the means to which they could create an appropriate way to reconcile the social values and the environment in the Northern vicinity, so an analysis ought to maintain the protocol and the federal environmental assessment procedures contained in Chapter 3 of the agreement to clarify the present position in the jurisdictional and jurisdictional overlapping as regards the environmental assessment regime in that territory.

METHOD

With regard to methodology, we used the analytical approach. The study took into consideration the Social Values and the incapacity of the present procedures of implementing these in Nunavik, their legal status and, finally, their criticism. The presentation of the relevant procedures

The normative framework for the environmental assessment regime specifically applicable in Nunavik is established by Chapter 3 of the JBNQA Agreement and by the taxation regime (Quebec and federal regimes).

The legal analysis

The legal literature in the Chapter 3 is not very abundant. For the purpose of the present analysis, we thus reined, information, in the jurisprudence made by the Canadian courts as an environmental assessment regime similar to the one established by the JBNQA, so the present analysis is based directly on the Chapter 3 of the Canadian Environmental Assessment Act

The critical examination

The critical examination is essentially based on the critical examination of the Canadian environmental assessment regime in Quebec. We outlined an analysis of the most critical points and the main issues of the environmental assessment system in Quebec. The first study was concluded in 1988 by the Nuclear Committee linked to the environmental assessment procedures of the Quebec Department of Environment and the second, in 1995, by the Conservation of Planning and Equipment of the Quebec National Assembly. We should specify here that we did not use to address again in a systematic basis most of these criticisms and to evaluate them with respect to the environmental assessment regime in Chapter 3 of the agreement; rather, we wanted to show the position that these criticisms could today arise from their own analysis.

RESULTS

The environmental assessment mechanism of the Chapter 3 of the JBNQA Agreement is the first environmental assessment system in Canada. They were the most difficult at the time. On the ships, we can affirm that, at the time, they used to visit the less time. Indeed, they are still many important measures and requirements for ensuring rational and efficient environmental assessment.


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NOTES


INTRODUCTION

Rationale & Objectives — In the modern Arctic world, commercial or formal food supply activities constitute a prerequisite for local society. This research seeks to describe each activity in Greenland, while analysing their respective characteristics. The food sector is thus explored as a case study from which other Arctic regions can be compared in order to establish a global diagnosis on food security in the Arctic region.

IMPORTANT OF COMMERCIAL SUPPLY

Quantitative Importance — The partial food economics activities in the Greenlandic economy is considered to be in line with the level of domestic and international trade. Almost half of the value of the total production in Greenland comes from the food industry. The share of hidrostikke is about 10% of the food products selling, followed by meat trade (37%). The marine transportation of local products and the beverage industry constitutes significant activities too.

PRODUCTION

richards — The fishing industry is a major sector of Greenland’s economic structure. The situation results in commercial food networks that largely differ from what is observed elsewhere in the North. First, the importance of the local food harvest is much greater; several hundred houses of all sizes operate in the fisheries (mostly exploiting shrimp and spider).

Local Harvest — In Greenland, “local harvest” is found in most local communities to a certain extent, even though the harvests are much smaller compared to the local food trade. The local harvests are of high quality and play a significant role in the local communities.

Retail Trade — In Greenland, there is a “vis-a-vis” policy followed by a local enterprise for foodstuffs in small communities. The latter is active in many small and remote communities, and each receives a budget from the government to help it maintain its prices regardless of the high selling costs involved. In addition, Greenland has the lowest prices in the rest of the circumpolar world, owing to its supply of European products of exceptional quality. This has led to considerable increases in the number of U.S. dollars spent by Greenlanders. The number of supermarkets has grown in recent years, and their services are becoming more diversified. The high levels of Greenlanders are now in the process of becoming more diversified.

DISTRIBUTION

Transportation — In the Arctic, transportation is a major component of the food industry. Food is often sorted and distributed on a large scale, requiring special infrastructure and logistics. This is particularly true for Greenland, where the distance between the communities is vast. As a result, the availability of local products is limited, and consumers need to purchase goods from larger cities to meet their needs.

Local Markets — In Greenland, “local markets” are found in most local communities. In the form of outdoor markets, where hunters and fishermen sell directly their products to consumers. These markets are maintained by local governments, with the association of hunters and fishers organizing and setting the price of the produce. It is estimated that roughly 90% of the harvesters sell their products in these markets. In addition, the local markets also serve as a place for social interaction and local traditions.

INTERNATIONAL TRADE

Imports — Engelsby on the market is composed of both products, namely food products. Products from industrial fishing are almost totally exported outside Greenland. The small size of local markets is equivalent to 10% of the total value of Greenland production.

INCOME — The food supply is considered to be a trade for imported local food, mainly from Denmark. These goods represent 35% of the total income. In terms of the situation in Greenland, the income generated from the sale of imported food is equivalent to the income generated from the sale of local food.

The importance of Greenland's food security to the country, and provides considerable resources for the country's economic gains.

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For more information on the project, please visit the website: http://www.happinessdevelopment.org.

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INTRODUCTION

Although international law pertaining to the management of marine mammals exists for over fifty years, it remains largely unknown. Yet the issues involved in the current crisis are not only critical to the survival of our oceans and the flora and fauna they support, but are also critical to the survival of our own species. The problems involves legal considerations and challenges to the conservation of marine species, both in terms of their preservation and sustainable management.

The cetaceans: problems of supply

The main international legal instruments concerning the exploitation and conservation of cetaceans are the International Whaling Commission (IWC) and the Convention on Biological Diversity (CBD). The first objective of the IWC is to prevent the killing of cetaceans, while the main objective of the CBD is to conserve and protect the biological diversity of cetaceans.

The seals: economic and ideological problems

The main international legal instruments concerning the exploitation and conservation of seals are the International Whaling Commission and the Convention on Biological Diversity. The main objective of the IWC is to prevent the over-exploitation of seal populations, while the main objective of the CBD is to conserve and protect the biological diversity of seals.

DISCUSSION

• Although most trade is organized by non-governmental organizations, NGOs, and companies, trade networks, such as illegal and money laundering, are still an issue.

• Various measures have been taken to address the problem of illegal trade, including the implementation of national and international laws and regulations, as well as the establishment of international cooperation mechanisms.

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Véronique Bélanger and Paolo Hailey

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WHAT DOES «SUBSISTENCE» MEAN?

Multiple meanings of the concept “subsistence” exist in context. In fact, the concept can, and indeed does, vary totally from one setting to the next. It can take different meanings and values, and its translation is impossible to translate the meaning that may not exist in action. Consequently, damage to the meaning of the word subsistence in any context is significant. Thus, each subsistence is an appropriate way of interpreting the meaning that may exist in context. This can be an accurate reflection of different meanings of the concept, and its translation is even more so.

ECOLOGICAL PERSPECTIVE

The ecological perspective also holds for the need to understand the meaning of subsistence. At one time, the word “subsistence” was used to describe the basic needs for food, clothing, and shelter, and the social and cultural norms that govern these needs. In recent times, the word has been extended to include the idea of sustainability, which refers to the ability of a system to maintain itself over time without degrading its ability to support future generations.

The concept of subsistence is not only limited to the natural environment, but also includes the social and cultural environment. This can be illustrated by the example of a society that is dependent on agriculture for its subsistence. In such a society, the concept of subsistence is not just about ensuring that people have enough food to eat, but also about ensuring that they have access to land and water resources, and that they have the knowledge and skills to use these resources effectively.

The ecological perspective emphasizes the importance of understanding the relationship between the environment and the economy. It highlights the need to ensure that economic activities do not deplete natural resources or harm the environment. It also emphasizes the importance of maintaining a balance between economic growth and environmental protection.

CONTENT ANALYSIS

In order to understand the concept of subsistence, a literature review of the sources where “subsistence” is defined around the world has been conducted. Content analysis was based on the principle of understanding the concept of subsistence as a process of identifying the dominant themes and patterns in the sources. By identifying the themes that dominate the sources, it was possible to understand the overall concept of subsistence.

In this study, the concept of subsistence was analyzed in the following dimensions: (1) the type of subsistence, (2) the source of subsistence, (3) the amount of subsistence, (4) the quality of subsistence, (5) the duration of subsistence, (6) the distribution of subsistence, and (7) the relationship between subsistence and other concepts.

The results of the content analysis indicate that the concept of subsistence is not limited to the provision of basic necessities for human survival. It also includes the context in which these necessities are provided, as well as the social and cultural norms that govern their provision.

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REFERENCES


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