

ARCTIC SOCIAL INDICATORS

follow-up to the Arctic Human Development Report



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- a follow-up to the Arctic Human Development Report

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Back-cover, lower: Ice-floe jumping: A challenging sport among adolescents when the ice is breaking up in spring. Tasiilaq, East Greenland, 1893 inhabitants (2009). Photo: Rasmus Ole Rasmussen

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Editors: Joan Nymand Larsen, Peter Schweitzer, and Gail Fondahl

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Nordic Council of Ministers

Ved Stranden 18

DK-1061 Copenhagen K

Phone (+45) 3396 0200

Fax (+45) 3396 0202

Nordic Council

Ved Stranden 18

DK-1061 Copenhagen K

Phone (+45) 3396 0400

Fax (+45) 3311 1870

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Project Leaders

Joan Nymand Larsen
Peter Schweitzer

Editorial Team

Joan Nymand Larsen
Peter Schweitzer
Gail Fondahl

Project Manager

Joan Nymand Larsen

Executive Committee

Joan Nymand Larsen
Peter Schweitzer
Gail Fondahl
Rune Sverre Fjellheim

Acknowledgements

Lead authors, contributing experts, and ASI working group participants (in alphabetical order):

Andrey Petrov	Hugh Beach	Lee Huskey	Rune Sverre Fjellheim
Anna Sirina	Igor Krupnik	Leslie King	Solveig Glomsrød
Birger Poppel	Jack Kruse	Magne Ove Varsi	Stephanie Irlbacher Fox
Bruce Forbes	Jan Henry Keskitalo	Matthew Berman	Susan Crate
Carl Christian Olsen (Puju)	Jens Dahl	Niels Einarsson	Tatiana Vlassova
Ellen Inga Turi	Joan Nymand Larsen	Oran Young	Torunn Pettersen
Gail Fondahl	Jón Haukur Ingimundarson	Peter Bjerregaard	Vladimir Bocharnikov
Gorm Winther	Kathleen Graves	Peter Schweitzer	Yvon Csonka
Gunhild Hoogensen	Lawrence D. Kaplan	Rasmus Ole Rasmussen	
Gunn-Britt Retter	Lawrence Hamilton	Raymond Barnhardt	

Arctic Maps

Winfried Dallmann (AHDR map)
Rasmus Ole Rasmussen and José Sterling (Nordregio maps)

Local - and Student Assistants

Søren Bitsch
Brynjar Helgi Ásgeirsson
Olga Sif Guðmundsdóttir
Sigrid Rasmussen
Nikolaj Nordby Thøgersen

Note Taker

Marg Kruse

Editorial Services

Ruth Wilson, West Coast Editorial Associates, B.C.

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The Sustainable Development Working Group of the Arctic Council: Indigenous peoples' organizations, permanent participants, international organizations

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 Canada
 Denmark/Greenland/Faroe Islands
 Finland
 Iceland
 Norway
 Sweden
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 International Arctic Science Committee (IASC)
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 University of the Arctic

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 Department of Environmental, Social and Spatial Change (ENSPAC), University of Roskilde, Denmark
 Vancouver Island University, B.C., Canada

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Preface

This report is a result of and follow-up to the Arctic Human Development Report (AHDR), which appeared in 2004 and had been conducted under the auspices of the Arctic Council's Sustainable Development Working Group (SDWG). The AHDR marked processes of maturation within the Arctic Council and beyond. On the one hand, the AHDR represented the first social science-driven report prepared for the Arctic Council, indicating that various stakeholders, from politicians to Arctic residents, understood the importance of the "human dimension" for sustainable development in the Arctic. On the other hand, the processes leading to the AHDR marked new developments in the relationship between Arctic governance and scholarship, including coordinated support for the report from the Standing Committee of Parliamentarians of the Arctic Region (SCPAR).

The AHDR was largely met with approval and enthusiasm, signaling that human development in the Arctic had become a matter of widespread concern and interest. In the years since, Arctic human development has become even more critical for stakeholders in the Arctic and beyond. One of the reasons is certainly the impact of global climate change on Arctic environments and communities (see, among many other reports, the Arctic Climate Impact Assessment (ACIA) of 2004). As the Arctic has become an "early warning" site for climate-induced changes to come (the figurative "canary in the coal mine" for much of the rest of the world), the effects of these changes on arctic residents have become a matter of general concern. Thus, tracking Arctic human development through a small set of indicators becomes a matter of significant practical and theoretical relevance in times of (climate) change.

While the first thoughts regarding an Arctic Social Indicators (ASI) project reach back to the years 2004 and 2005, the majority of work for the initiative was produced during the years 2006-2009. Thus, the ASI activities largely coincided with the research initiatives of the International Polar Year (IPY) 2007-2008, which officially lasted from March 2007 to March 2009. Actually, ASI was recognized as an IPY activity by the International IPY programme office. Given that the IPY 2007-2008 differed radically from its predecessors – by its inclusion of the social sciences and of arctic residents –, the co-occurrence of IPY and ASI was more than pure coincidence. It was indicative of increased research activities in the Arctic (and Antarctic), as well as of increased input from Arctic residents who consider the study of human development as critical as the study of changing sea ice conditions.

Similar to the AHDR, ASI set itself the task of combining state-of-the-art arctic social science research with applied concerns of arctic countries and communities and of arctic indigenous peoples' organizations, the so-called permanent participants of the Arctic Council. While the applicability (and usefulness) of Arctic research to northern communities is the ultimate test of research that considers itself appropriate within the context of the Arctic Council's SDWG, this relevance cannot be achieved without the input from a broad spectrum of scholars and practitioners, representing the best in their fields. We hope that this report will nourish the growing recognition that the study and tracking of human development is necessary for understanding the Arctic, as well as necessary for increasing well-being in the circumpolar North.

This first ASI report is, by design, focused on the development of a small set of social indicators in the Arctic and cannot provide the implementation of these indicators. Data challenges, as outlined in the final chapter of this report, need to be overcome in order to implement the set of social indicators proposed in this report. Thus, as we are now launching this first ASI report, preparations are under way for a follow-up focused on the implementation of what is being suggested here. While we hope to have your undivided attention for ASI-I, we want to communicate that our task at hand will be incomplete if there were not an ASI-II report in due time.

Joan Nymand Larsen and Peter Schweitzer
Project Leaders, ASI



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1 Introduction: Human Development in the Arctic and Arctic Social Indicators

Joan Nymand Larsen and Gail Fondahl
With a contribution by Oran Young

1.0 Introduction

Rapid change, both physical and social, challenges Arctic communities. While climate change is perhaps the most obvious and widely acknowledged influence on the future of circumpolar societies, other factors play a more immediate role in the lives of Arctic residents in many areas. Globalization, economic and political transformations, changing cultural landscapes, often driven from afar but experienced in the North, are all requiring adaptations. In the first years of the twenty-first century, in recognition of these social challenges, the Arctic Council supported the documentation of Arctic residents' well-being around the Circumpolar North. It commissioned the *Arctic Human Development Report* (AHDR), in 2002, as a priority project during Iceland's chairmanship of the Arctic Council, to provide "a com-

prehensive knowledge base for the Arctic Council's Sustainable Development Program", which could "serve as a point of departure for assessing progress in the future" (AHDR 2004:15). The report was also to highlight "dimensions of human well-being that are not prominent in mainstream discussions of this topic" (AHDR 2004:15).

The resulting *Arctic Human Development Report*, published in 2004, offers a comprehensive overview of the state of human development in the Arctic at the beginning of the twenty-first century. As such, it constitutes a unique and indispensable resource. It addresses Arctic demography, political, economic and legal systems, and key issues in the North such as resource governance, community viability, human health and well-being, education, gender issues, and circumpolar international relations and geopolitics.

The village of Alluitsup Paa, South Greenland, a settlement based on fisheries and hunting activities with 319 inhabitants (2009).
Photo: Sigrid Rasmussen.



The AHDR emphasized the need to develop a system for tracking trends in human development in the Arctic over time, through the identification of a set of indicators (AHDR 2004:11). The AHDR itself mostly offers a snapshot of the region at a particular point in time, and thus a baseline or a starting point from which to measure changes over time in the circumpolar world. While its purpose was not to provide a well-developed longitudinal perspective on human development in the Arctic, the AHDR proposed that the development of some means of monitoring such trends would be extremely helpful from the perspective of those involved in the policy process.

A critical outcome of the AHDR was the conceptualization of dimensions of human development in the Arctic. The report contended that measuring human development in the Arctic would require a distinct set of indicators. Simply using the UN Human Development Index to measure human development in the Arctic would result in a distorted picture. The dilemmas in doing so were apparent to those spending any significant time in the Arctic: groups who had minimal articulation with the state in which they were encapsulated, who controlled their daily lives, depended on local resources, and enjoyed a vibrant cultural life might consider their well-being as better than compatriots whose access to material means (e.g. permanent housing, imported foodstuffs) was higher. Access to a waged job and its benefits was frequently less valued than was time to spend on the land, harvesting country foods and materials, even when wages would cover

more commodities. Considering such dilemmas, and listening to the concerns and assessments of arctic residents regarding definitions of well-being, the authors of the AHDR identified a number of key domains as determinants of well-being in the Arctic that have not been systematically considered:

- *Fate control* – guiding one's destiny
- *Cultural integrity* – belonging to a viable local culture; and
- *Contact with nature* – interacting closely with the natural world (AHDR 2004:11)

The Arctic Social Indicators (ASI) project responded to the AHDR, in aiming to develop a set of indicators to track changes in human development in the Arctic, for domains that reflect prominent aspects of human development in the Arctic. Initiated by the Stefansson Arctic Institute, Akureyri, Iceland, the ASI project in its first phase (2006-2009) was an International Polar Year project and was endorsed by the Arctic Council. It grew organically from the AHDR.

As described below in greater detail, the ASI project chose six domains in which to develop indicators for monitoring human development – the three domains identified by the AHDR noted above, and the three domains constituting the UN Human Development Index (life expectancy, literacy and standard of living), adapted for the Arctic context (to health/population, education and material well-being). This suite of domains provides an approach that is broad and inclusive while remaining manageable. The rationale for each of these domains is described in the specific chapter on the respective domain. The challenge was then to find an indicator or concise set of indicators that could practicably depict trends of development (positive or negative) for the domain in an intelligible manner.

This chapter provides an introduction to the ASI project. A short history of the AHDR and its relation to the ASI project, is provided, written by one of the co-chairs of the AHDR Report Steering Committee, Oran Young. The chapter then briefly summarizes what social indicators are and what they are used for. The process followed by the project's participants for developing Arctic social indicators is then described.

Two Nenets girls from Yarsalinski Sovkhoz play with a toy chum near Bovanenkovo gas field on the Yamal Peninsula, West Siberia, Russia.
Photo by B.C. Forbes





Two large cruise ships, Costa Magica and Queen Victoria, in Akureyri harbour, Northern Iceland. 2009.

Photo: Jón Haukur Ingimundarson

We explain the criteria used for selecting these indicators, and then preview the contents of the rest of this volume.

Like the AHDR, this report on Arctic social indicators is directed at a broad audience, including the science community, inhabitants of the Arctic, students, policymakers at all levels, and the Arctic Council and its Sustainable Development Working Group (SDWG).

ethnic groups, with the health status of northerners in each Arctic state being considerably worse, on average, than that state's national average.

The formal economy of the Arctic is largely based on natural resource extraction. Many of these resources are of critical geopolitical importance both nationally and globally. However, resource rents largely flow out of the Arctic, and Arctic communities are often highly de-

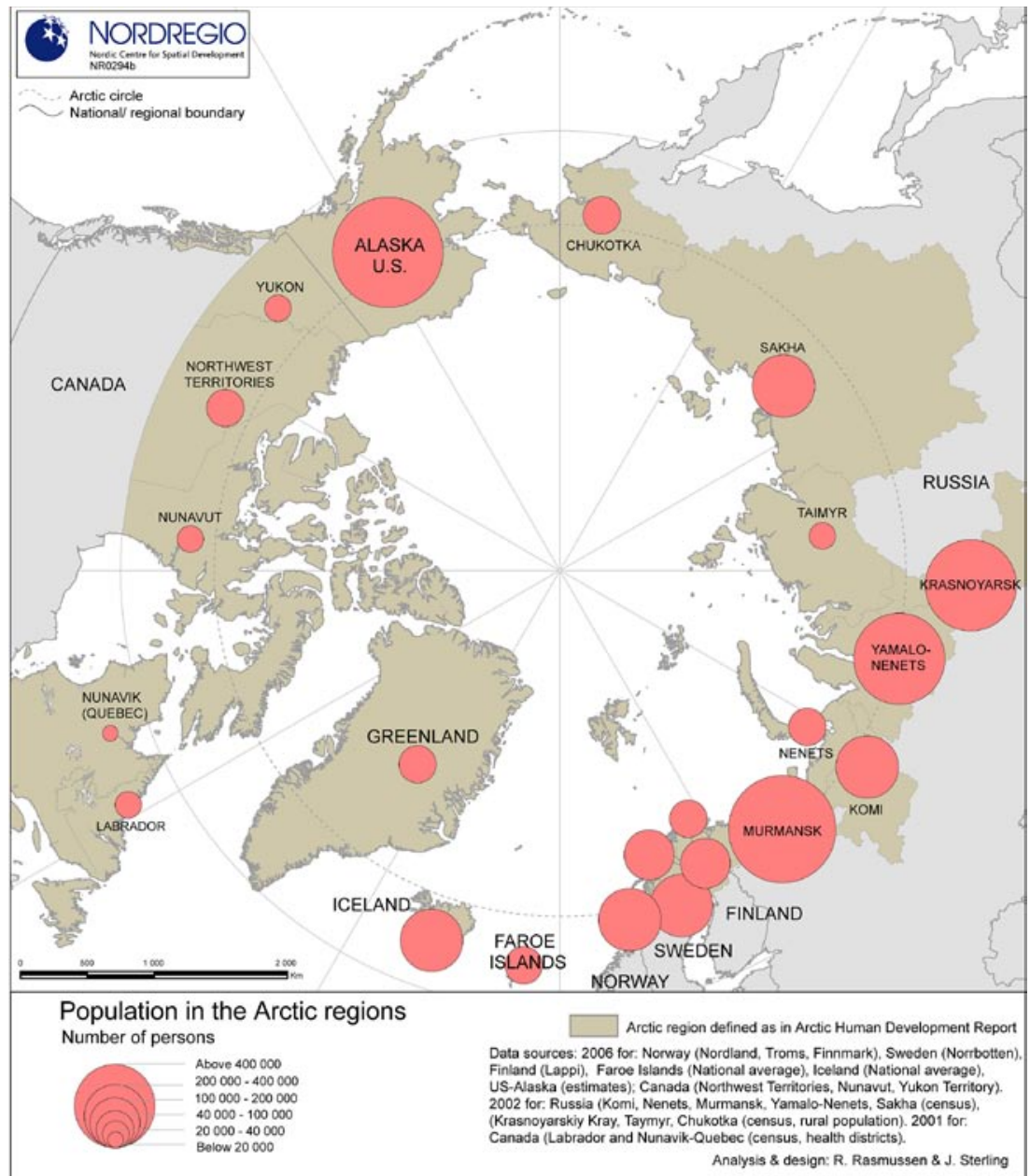
1.1 Overview of Human Development in the Arctic

As the *Arctic Human Development Report* notes, “the Arctic has emerged as a distinct region in public policy discussions” (AHDR 2004:18). The ASI project adopted the definition of the Arctic from AHDR. In this section we review some of the findings of the AHDR, especially those relevant to the six domains chosen for indicator construction.

The Arctic includes about four million inhabitants. Its demography is diverse, with different areas characterized by varying shares of indigenous, settler and transient populations, varying levels of urbanization, and different rates of population growth or contraction. The Arctic population does in general tend to be younger than that of the national average. Some areas are characterized by high levels of out-migration, which tends to involve a larger number of females than males. Disparities in health are observed across both regions and



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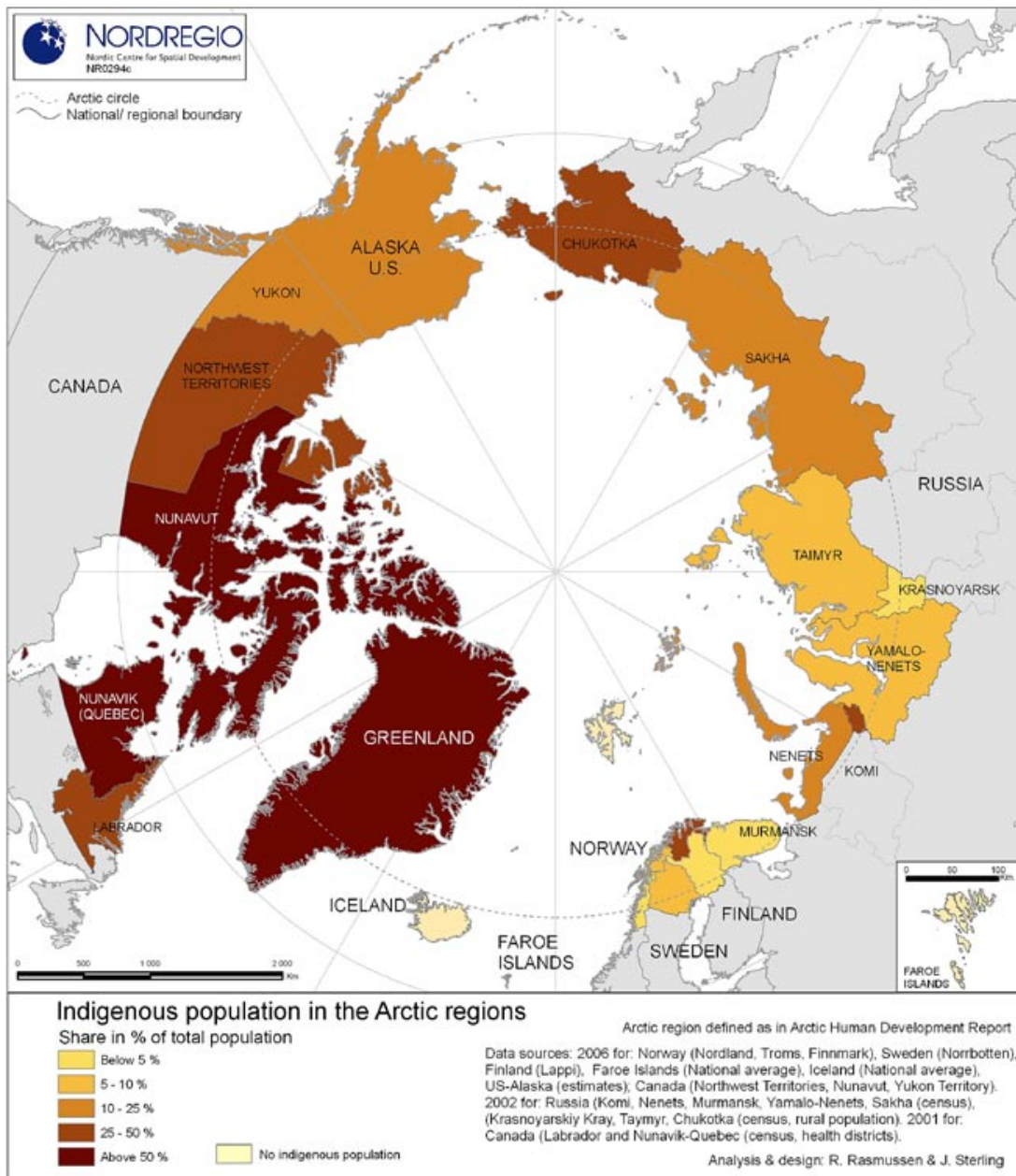
Smelting of nickel ore in Monchegorsk, Kola Peninsula, Russia.
Photo: Rasmus Ole Rasmussen



pendent on state subsidies. Primary (extraction) and tertiary (service) sectors predominate in Arctic economies, with little development of

secondary activities (manufacturing). At the same time informal economic activities are of great importance in many areas of the Arctic: a combination of subsistence activities with wages or transfer payments is a common strategy for pursuing well-being among Arctic residents (AHDR 2004: 70-74).

Education in the Arctic has evolved from a more experiential-based knowledge transfer and training system, stewarded by one's elders, to more formalized, state-directed systems, which have prioritized 'Western' values. The introduction of compulsory formal education has been challenged by the vast, thinly populated spaces of the Arctic, which have been managed by residential schooling. Very uneven dis-



tribution of higher educational opportunities has resulted in low utilization by Arctic residents, especially by males. More recently, a move to see education as a distributed resource is addressing issues of access, as is the greater inclusion of content that speaks to local needs and conditions (AHDR 2004: Chapter 10).

The Arctic has been affected by both global environmental change and globalization. Climate change has received much attention, with its impact on the land-, ice- and water-scapes of the North, on the distribution of faunal and floral resources, on movement across the landscape, on settlement patterns, and on a host of other systems and activities. The Arctic's populations have experienced notable shifts in

climate in the relatively recent past (e.g. the Little Ice Age of the 15th-18th centuries), the anthropogenically forced warming is unprece-

Traditional Gold Dredger, Dawson City, Yukon, Canada.
Photo: Rasmus Ole Rasmussen





Sámi University College.
Photo: Johan Mathis Gaup

dented in both magnitude and scale. However, it is globalization that has been the more weighty force in the past century, for the many Arctic groups that had experienced relatively little contact with other populations prior to this period (though none were fully isolated, and some enjoyed long-term and far-reaching ties to parts of the North and the world). Accelerated articulation, including through electronic media and travel, has brought on rapid social change, requiring extensive adaptations.

As Arctic groups adapt, they have indicated that the viability of their communities relies on, or at least is much enhanced by, having control over their own fate, sustaining contact with nature, and retaining their cultural identity (AHDR 2004:240). Loss of cultural identity can lead to social alienation, which in turn can precipitate destructive behaviors toward oneself, other persons or things. Cultures continually

transform; it is when the transformations are forced from outside at rates challenging endemic adaptations that communities and societies are more likely imperiled. Arctic residents frequently express worries about loss of indigenous language and traditional knowledge, two key components of culture, though in some instances revolutionary new methods for perpetuating and transmitting cultural institutions are being explored.

More broadly, those who feel they are unable to control their own destiny, whether political, economic or along other axes, also may feel anomie. Those feeling empowered to control their fate are more likely to take actions needed to better their situation. Arctic individuals and communities have often experienced colonial and neocolonial relations that have eroded their sense of fate control; numerous new arrangements for increased local governance (often

Kids enjoying a nice
spring Sunday by playing
on trampoline in Tasiilaq,
East Greenland.
Photo: Rasmus Ole
Rasmussen



shared) over land and resources are starting to address such imbalances, if in a nascent fashion.

The connection to land is often asserted as a key element of well-being in the Arctic. This well-being includes both the physical dimension of harvesting country food and recreational activities, and the more cultural and spiritual elements of communing with nature while pursuing such activities.

The individual chapters on these domains, and the three that offer adaptations of the UN

HDI domains, describe in greater detail each domain and its importance to human well-being in the Arctic. As is immediately clear, the domains are to a degree interlinked: a higher attainment in one domain may very well influence success in another. Yet each describes a fundamental sphere of well-being that merits measurement and monitoring, in order to ascertain changing trends and to suggest policy that will encourage developments in positive directions.

2.0 From AHDR to ASI

By Oran R. Young¹

The rationale for the Arctic Social Indicators (ASI) project rests squarely on the desirability of tracking trends in key elements of human development identified in the Arctic Human Development Report (AHDR 2004). The AHDR came into being as a mandate from the 2002 Arctic Council Ministerial Meeting calling on Iceland (the council chair during the biennium 2002-2004) to launch the AHDR as a “priority project” to provide “... a comprehensive knowledge base for the Arctic Council’s Sustainable Development Programme” (Inari Declaration 2002). Work on the AHDR ended with Iceland’s delivery of the completed report to the 4th Arctic Council Ministerial Meeting in 2004 and the decision on the part of the ministers to “... **accept** with appreciation the Arctic Human Development Report and **recommend** that the Sustainable Development Working Group make full use of the report as a comprehensive knowledge base for the development of the Arctic Council’s Sustainable Development Programme and **direct** Member States and the relevant working groups of the Arctic Council to consider appropriate follow up actions” (emphasis in original) (Reykjavik Declaration 2004).

This section provides a brief account of the origins of the AHDR, the analytic framework the Report Steering Committee developed as a template for the preparation of individual chap-

ters of the report, the principal substantive findings of the report, and the rationale for the ASI project as a logical outgrowth of the AHDR.

The Origins of the AHDR

We can trace the origins of the AHDR directly to the 1996 Ottawa Declaration on the Establishment of the Arctic Council (AC), and even further back indirectly to the 1991 Rovaniemi Declaration on the Protection of the Arctic Environment that set up the council’s predecessor, the Arctic Environmental Protection Strategy (AEPS). Initial proposals for the creation of the AEPS called for a dual focus on environmental protection and sustainable development as twin pillars of this new cooperative mechanism (Young 1998). But the 1991 Rovaniemi Declaration said nothing about sustainable development, casting the role of the AEPS almost exclusively in terms of environmental protection and focusing on the establishment of four Working Groups - the Arctic Monitoring and Assessment Programme (AMAP), the Working Group on the Conservation of Arctic Flora and Fauna (CAFF), the Working Group on the Protection of the Arctic Marine Environment (PAME), and the Working Group on Emergency Prevention, Preparedness, and Response (EPPR).

Still, issues framed in terms of sustainable development or social welfare persisted. Already in 1994-1995, the AEPS began the process of creating an ad hoc task force on sustainable development. The transition from the AEPS to the AC during 1996-1997 led to further change. The Ottawa Declaration joined the four AEPS working groups together to form an Environ-

¹ Oran Young, a professor of environmental institutions and governance at the Bern School of Environmental Science and Management at the University of California (Santa Barbara), was co-chair of the Report Steering Committee for the AHDR and member of the editorial team for the report.

mental Protection Programme and called for the development of a parallel Sustainable Development Programme (understanding the two programs would intersect at many points). The establishment of the Sustainable Development Working Group (SDWG) represented a breakthrough for those concerned with the welfare of the Arctic's human population.

The challenges involved in integrating sustainable development into a coherent program of regional cooperation in the Arctic persisted. In the early days, AC members had difficulty even agreeing on rules of procedure for the SDWG. Part of the problem stemmed from the inherent fuzziness of the concept of sustainable development itself. Concerns of various stakeholders (including non-state actors like the Indigenous Peoples Organizations) also complicated matters, as did the absence of clear boundaries regarding the agenda of the SDWG, which made it possible for some parties to introduce broadly normative concerns (e.g. questions of land ownership or harvesting rights) into the deliberations of this body. By the turn of the century, the increased emphasis on sustainable development in the Ottawa Declaration had yet to bear fruit in the work of the Arctic Council. Given this slow start, it is not surprising that the issue of how to address the sustainable development agenda emerged as a key topic by the beginning of the Finnish Chairmanship (Fall 2000).

Finland's receptivity to institutional innovation in the AC opened the door for new efforts to clarify the council's role regarding sustainable development. At this stage, the Standing Committee of Parliamentarians of the Arctic Region (SCPAR) stepped in and called for an assessment of the state of human welfare in the Arctic and a clarification of the major issues facing the residents of the Arctic in their efforts to achieve a healthy and satisfying lifestyle. At its fifth conference, held in Greenland shortly before the October 2002 AC Ministerial Meeting, the SCPAR issued a clear call for the adoption of the AHDR as a priority project and provided unambiguous evidence of support for this project on the part of the community of policymakers. The ministers then decided to include the initiation of the project as an action item in the Inari Declaration.

One factor did complicate discussion regarding the remit of the AHDR. Some participants thought the AHDR would compete with the Survey of Living Conditions in the Arctic (SLiCA), a large-scale research project intended to gather extensive new data regarding major aspects of the living conditions of indigenous peoples in the Arctic. As the discussion progressed, however, it became increasingly clear that these projects were largely complementary. The AHDR would be an effort to assemble, evaluate, and integrate current knowledge relating to human development in the circumpolar Arctic. As other cases (AMAP 1997; ACIA 2004) made clear, the conduct of such assessments has emerged as highly effective tool at the disposal of the Arctic Council. As an extended effort to generate new knowledge, results stemming from SLiCA could provide data for those working on the AHDR. This realization paved the way to the final language of the Inari Declaration mandating the AHDR as a "priority project" of the Arctic Council.

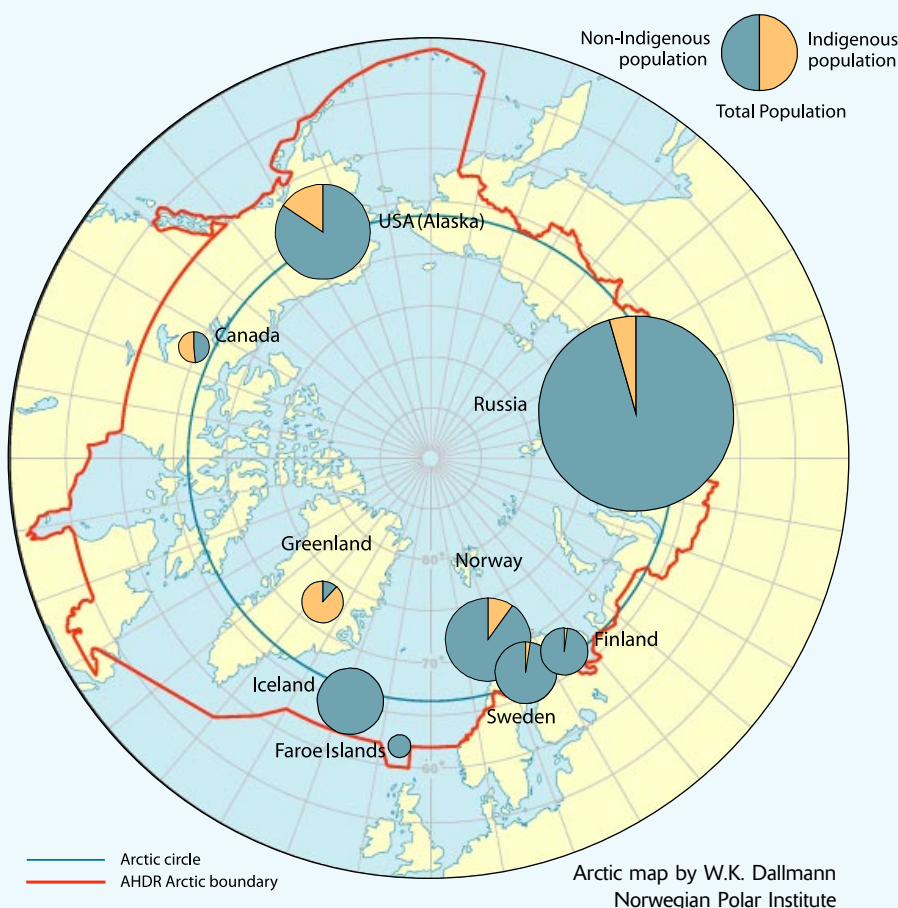
Human Development in the Arctic

In designing the AHDR, we chose deliberately to focus on the idea of "human development" rather than "sustainable development." Our goals were to highlight the quality of life of the Arctic's permanent residents and to celebrate many features of life in the Arctic, without ignoring or obscuring the more painful aspects of human activities in this region during modern times. Given the well-developed activities of the working groups belonging to the Arctic Council's Environmental Protection Programme, it seemed natural to direct attention to human development in endeavoring to devise a roadmap to guide the work of the AC's Sustainable Development Programme.

Though relatively easy to grasp conceptually, the idea of human development poses problems when it comes to empirical applications. To meet the challenge of devising usable measures of human development, we turned first to the UN's Human Development Index (UNHDI). Created during the early 1990s by the UN Development Programme, the UNHDI is based on the premise that human development is a multi-dimensional phenomenon. Calculated on an annual basis for all members of the United

Nations, the UNHDI has achieved considerable influence as a measure of trends in human welfare over time at the level of individual countries. It is a composite index with three components: life expectancy at birth, education (represented by a combination of adult literacy and school enrolments), and GDP per capita. Although controversial in some quarters, the UNHDI has made an important contribution to thinking about human development and social welfare more generally. This measure of human development diverges from most measures of material welfare (e.g. GDP per capita) beyond comparatively low levels; this divergence increases as a country becomes increasingly affluent. Thus, GDP per capita alone is not a good indicator of human development or social welfare for advanced industrial countries.

In our effort to understand human development in the Arctic, we took the UNHDI as a point of departure. This effort soon revealed an anomaly that was to become one of the central issues in the preparation of the AHDR. Many areas of the Arctic and especially the more remote areas with substantial indigenous populations would not achieve high scores on the UNHDI. The reasons for this are clear. Many Arctic communities do not rank high in terms of life expectancy, particularly among indigenous peoples where suicide rates and accidental-death rates are high as well as in the Russian North where the effects of the post-Soviet collapse are still substantial. Most Arctic residents today are literate. But school enrolments, especially at the secondary and tertiary levels, are comparatively low in the Far North. GDP per capita is often deceptive as a measure of well-being in the Arctic. If we include income derived from hydrocarbons and minerals extracted from northern locations, GDP per capita can seem impressive. But most of the income associated with these extractive industries flows out of the Arctic and into the income streams of large multinational corporations. GDP per capita at the community level is comparatively low in many parts of the Arctic, especially if we leave out transfer payments and do not have a workable method for integrating the informal or subsistence economy into the calculus.



But here is the puzzle. While the Arctic's permanent residents do not rank high on a measure like the UNHDI, many individuals in this region exhibit a strong sense of well-being. What accounts for this anomaly? The effort to answer this question and, in the process, to identify Arctic success stories became a focal point in the preparation of the AHDR. We did not discard the UNHDI. But the Report Steering Committee concluded at an early stage that there must be more going on with regard to human development in the Arctic than what the UNHDI is able to capture. Eventually, we reached consensus on a strategy of supplementing the three elements of the UNHDI with three additional elements that the AHDR characterizes as fate control, cultural integrity, and contact with nature.

Fate control is a matter of being in charge of one's own destiny. We heard again and again from Arctic residents that fate control is a matter of profound importance to them. This is true not only of the region's indigenous peoples but also of many settlers who have made a conscious choice to reside in the Arctic perceived as a frontier area in which the individual

can escape many of the restrictions or constraints associated with life in the mainstreams of modern societies.

Cultural integrity is another value of great importance to many of the Arctic's residents and particularly to indigenous peoples, even under conditions of rapid social change that have eroded aboriginal languages and brought technologies (e.g. television and various other forms of IT) to the region that make it easy for residents of remote areas to compare their lifestyles with those prevalent in other parts of the world. Cultural integrity is a matter of being surrounded by and able to interact regularly with others who share belief systems, norms, and a common history. The advent of highly mobile societies has made us increasingly aware of the costs of post-modern lifestyles in terms of the loss of cultural integrity. While there is evidence of cultural erosion in the Arctic, we heard repeatedly from residents of the region that cultural integrity is a key element in their thinking about the quality of life.

Contact with nature or the opportunity to interact on a regular basis with the natural world constitutes the third supplementary dimension of human development that emerged from our work on the AHDR. The residents of the Arctic are clear in their thinking about contact with nature as an element in the quality of life. In an era in which most members of mainstream societies have limited contact with nature, many Arctic residents come into contact with nature on a day-to-day basis as they go about their routine activities. They value this aspect of life in the Arctic.

In preparing the AHDR, we were limited largely to qualitative evidence and narrative accounts regarding fate control, cultural integrity, and contact with nature. We had neither the time nor the resources to devise quantitative indicators of these elements of human development. Yet, the more we probed the issue of human development in the Arctic, the more we became convinced of the importance of these factors to any effort to assess human development in the Far North.

The AHDR's Principal Findings

The AHDR delivered a snapshot of human development in the Arctic as of the time of its compilation during the opening years of the 21st century. The report lends support to some of the geographically limited and often anecdotal insights of those who have observed the disruptive effects of rapid social change in the Arctic during the last 50 years. The evidence also leads to a number of conclusions regarding the resilience of individuals and their communities, despite the impacts of rapid social change. The AHDR reported a variety of success stories that help to resolve the puzzle described in the preceding section regarding the existence of a strong sense of well-being even among groups of people in the Arctic who do not rank high in terms of the UNHDI.

The AHDR observes that "[h]uman societies in the circumpolar North are highly resilient; they have faced severe challenges before and adapted successfully to changing conditions" (AHDR 2004:230). This encouraging finding is not meant to mask the challenges to cultural in-

Honningsvåg in Northern Norway, September 2009. Reindeer wandered into town during a season of roundup and rutting.
Photo: Jón Haukur Ingimundarson



tegrity arising from a variety of forces, including the erosion of indigenous languages, relocations of communities for political as well as social and environmental reasons, the introduction of unfamiliar systems of land tenure, and environmental changes affecting the availability of subsistence resources. Many observers have documented the historical role of adaptiveness among Arctic residents as a source of resilience in Arctic communities. Although circumstances have changed in many of these communities in ways that increase their vulnerability, it would be a mistake to overlook the capacity of Arctic peoples to adapt to a range of emerging stresses arising from the effects of globalization and biophysical developments like climate change. Still, Arctic communities today are subject to social, cultural, economic, and environmental forces that have given rise to a suite of interactive stresses affecting the cultural integrity dimension of human development.

Economic conditions in the Arctic present a paradox that has important implications for human development. In terms of GDP per capita, the Arctic has experienced considerable growth in recent decades. Yet Arctic economies are narrowly based and subject to great fluctuations driven largely by outside forces. In much of the Arctic, there is a dual economy in which one component is heavily based on extractive industries generating income and rents that tend to flow out of the Arctic and the other component primarily features a combination of subsistence activities and transfer payments from higher levels of government. The resultant dependence of Arctic communities makes it hard for individuals to sustain a sense of control over their own destinies. Increasing numbers of Arctic residents have come to depend on relatively low level jobs in volatile extractive industries and on transfer payments provided by outsiders who can reverse current policies without consulting the beneficiaries.

Political and legal changes often add complications to this situation regarding feelings of fate control on the part of Arctic residents. A striking and generally positive development is the trend toward the devolution of authority to regional public governments in the Arctic (e.g. the Greenland Home Rule, the territory of Nunavut in Canada, and the North Slope



Rider's view of reindeer from a Nenets sledge crossing summer tundra, Yamal Peninsula. Photo by B.C. Forbes.

Borough in Alaska). But these governments are heavily dependent upon subsidies from central governments or revenues derived from extractive industries that will not last indefinitely. The trend toward devolution of authority is also subject to reversal as a result of shifting policies at the national level (e.g. the reassertion of Moscow's control over regional governments in the Russian North). An additional complication arises in cases where indigenous or aboriginal political systems vie for influence with public governments.

A similarly complex story arises in connection with subsistence activities that play a key role in maintaining contact with nature for many Arctic residents. Arctic organizations have managed both to counter efforts to terminate subsistence harvests (e.g. the harvest of bowhead whales in Alaska) and to become prominent players in a variety of co-management arrangements designed to share decision-making between regional or national governments on the one hand and user groups on the other. Yet environmental changes that produce unfamiliar biophysical conditions and unanticipated changes in the abundance or condition of subsistence resources are producing powerful counter effects in many areas. The number of cases in which whale hunters are stranded as a result of unforeseen changes in the behavior of sea ice has increased; caribou herds are experiencing fluctuations that subsistence hunters find hard

to understand and difficult to cope with effectively. While such changes have not reduced the importance of contact with nature as a source of human development in the Arctic, their anticipated increase is worrisome with regard to this dimension of human development that is prized among many settlers as well as most indigenous peoples in the Arctic.

From AHDR to ASI

The AHDR has become an important reference work for those taking part in the activities of the SDWG; it is a standard reference for those seeking to improve the coherence of the SDWG's work program. Treated as a snapshot of conditions prevailing in the Arctic in the early years of the 21st century, the picture that the AHDR presents is clear and generally persuasive. But the question of trends looms large. How can we go about measuring trends in Arctic human development? The value of following up on the AHDR by developing quantitative indicators of human development and using these indicators to track trends over time is evident. The Arctic Social Indicators project is a natural outgrowth of this chain of reasoning.

Developing social indicators that are both analytically satisfactory and empirically tractable is a challenging task. The ongoing work of the ASI makes this abundantly clear. To take a single example, the team working on material well-being concludes that we "... face a genuine dilemma suggesting an indicator for well-being in the Arctic" (see chapter 3). Direct measures

of per capita or household income are relatively tractable. But they leave out important elements of material well-being, including subsistence activities and transfer payments which are important in the Arctic. Composite indices, which could integrate measures of informal activities and transfer payments, on the other hand, run into problems in terms of data acquisition and weighing individual components. And this is a relatively easy case in comparison with measures of factors like fate control and contact with nature. Still, the effort to make progress in this realm is essential.

Any indicator captures some features of complex realities and omits or deemphasizes others. A little reflection on familiar and widely used measures, such as economic indicators like GDP per capita, unemployment rates, and interest rates, will suffice to demonstrate that the creation of indicators is a slow and labor-intensive process. There is no doubt that refining suitable indicators of human development in the Arctic will take time and involve a step-wise process in which initial proposals are vetted empirically and refined or replaced over time as our ability to capture the essential features of human development under the specific conditions arising in the Arctic grows. Viewed in this light, the ASI project constitutes a major step forward in moving us toward an ability to track trends in key elements of human development in the Arctic and, as a result, guiding discussions regarding critical questions in the SDWG and in the Arctic Council more generally.

3.0 Social Indicators: Explanation and Utility

Indicators are a tool to put more information into the hands of more people, information that can inspire action and lead to better decision-making. (Gahine et al. 2003: 665)

Groups such as governments and non-governmental organizations are increasingly using indicators – social, environmental, economic – to monitor trends in human development. Indicators, as simple measurements of key phenomena in complex human systems, enable us to track the direction and rate of change, and thus performance in various domains, and

progress toward specified goals. Indicators are useful aids for planning, for informing policy, for guiding decisions and actions. They are valuable simply in building awareness of current conditions and trends over time. Indicators are used by some groups to predict change, while other groups use them to promote change.

Human development is extraordinarily complex. To document all its facets would be impossibly complicated, time-consuming, and costly. Even a single domain (or category for the construction of indicators), such as education or health, has countless aspects that could be measured. A pragmatic approach is to choose a

small, representative set of indicators for key domains, to track over time and across space. Such indicators condense real-life complexity into a manageable amount of meaningful information. They are proxy measures, used to infer the condition and, over time, the trends in a system.

Such indicators may be quantitative or qualitative measurements. Often a statistic is used as a simple measurement of what is happening in a system. Indicators should be clearly defined, reproducible, unambiguous, understandable and practical. They should be relatively easy to measure in an accepted manner, stable, and suitable for use in longitudinal analyses. Harmut Bossell paraphrases a famous Einstein quote in observing that indicators should be “as simple as possible but not too simple” (Bossell 1999:11). They must also reflect the interests and views of different stakeholders.

Efforts to develop a set of indicators to measure human development require striking a balance between the analytic attractions of relying on a single indicator and the temptation to introduce a large number of indicators in the interests of developing a more accurate picture of complex and multi-dimensional phenomena. The development of the United Nations Human Development Index, comprised of measures of GDP, literacy and life expectancy, addressed the previous overly simplistic dependence on GDP alone as a measure of human development (Ibid.).

3.1 Developing a Set of Arctic Social Indicators: Process

To realize a key recommendation of the AHDR to devise “a small number of tractable indicators to be used in tracking changes in key elements of human development in the Arctic over time” (AHDR 2004:242), an ad hoc meeting was held in Copenhagen on Nov 12th, 2005, in conjunction with the International Conference on Arctic Research Planning. At this meeting, participants brainstormed about the concept, objectives, and feasibility of establishing such a set of Arctic social indicators and the practicality of establishing a working group to address the recommendation. The session included broad representation from the Arctic social science community, including several participants

who have been involved in the production of the AHDR, as well as other social scientists, knowledgeable about the Arctic who have a good understanding of the nature and uses of social indicators. Representatives from the policy and Arctic communities (indigenous and non-indigenous) also participated. The outcome of this meeting was the unanimous and enthusiastic support for the importance and feasibility of an Arctic Social Indicator working group.

Under the leadership of Drs. Joan Nyman and Larsen and Peter Schweitzer, funds were secured to pursue this initiative, and a working group of approximately 50 members was constituted, with representation from a broad range of disciplines, including Anthropology, Demography, Economics, Education, Geography, Linguistics, Political Science, and Sociology. While social scientists predominated, natural sciences were also represented. Indigenous participants were actively solicited. Geographic and gender balance were also considered in composing the group. The majority of members remained active over the course of the project.

The first ASI workshop convened in Akureyri, Iceland, in September 2006. It was attended by 25 members of the ASI Working Group, representing all eight Arctic states. Its objectives were to consider the three domains identified in the AHDR, as well as other domains critical to measuring human development in the Arctic; to establish criteria for indicator selection; to discuss and select potential indicators within each domain; and to engage in preliminary conceptual testing of the viability of the candidate indicators, using mainly anecdotal evidence. The group was also tasked with determining the steps necessary for proper testing and validation of the selected indicators.

Starting with these guidelines the working group adopted a pragmatic, bi-directional approach (Michalos *et al.* 2009), which employed a conceptual, ‘top-down’ approach to constructing a set of indicators based on our understanding of the key elements and determinants of arctic human development, combined with a ‘bottom-up’, empirical approach that considered currently available data that might be used as measures of the domains.



Drying fish on racks.
Village of Hjalteyri,
Northern Iceland, 2007.
Photo: Joan Nymand
Larsen

The working group confirmed the three domains suggested by the AHDR:

1. fate control,
2. cultural integrity, and
3. contact with nature

The group also resolved that the three domains represented in the UN Human Development Index were important

4. material wellbeing,
5. education, and
6. health/demography,

but that specific indicators relevant to the Arctic would be developed for these three domains.

Members of the ASI Working Group self-selected into domain teams, with five to eight persons in each team. Each team was led by two to three members, with one person designated to act as a central coordinator. After initial brainstorming about indicators, the members reconvened to develop a common list of key criteria for the selection of indicators. Criteria chosen were data availability, data affordability, ease of measurement, robustness, scalability and inclusiveness (see below for further discussion).

The domain teams adopted the selection criteria as a set of principles to guide indicator selection, recognizing that the criteria themselves were not precisely defined, and that trade-offs in their application had to be considered. For instance measures that might be easily available may be relatively less robust

than others that are less accessible. Thus, criteria were applied not to rule out candidate indicators, but to consider the challenges each indicator might pose across several conditions, were it to be selected. Teams were also tasked to aim for a single indicator, or a very small set of indicators, for their domain.

As an outcome of this first workshop, each of the teams arrived at a list of preliminary indicators. However, it was recognized that such a process hazards an *ad hoc* selection of indicators, with results being unpredictable and shaped by spur-of-the-moment insights. Indicator lists produced this way typically have large gaps in some important areas and are overly dense in others. The larger membership of the ASI Working Group provided a first review of the indicators, in order to ensure all significant aspects of Arctic human development were considered. Later in the process, local and northern stakeholders had the opportunity to critique and improve the indicator set.

A second ASI workshop took place in the summer of 2007, in Roskilde, Denmark. It was attended by 32 members of the working group, again representing all eight Arctic states. Among the workshop participants were seven indigenous participants as well as three young researches (Russian, Alaskan, and Norwegian Ph.D. students). At this workshop, work proceeded on the testing of indicators, ensuing reduction of the candidate list of indicators, and discussion of the structure and format of the final report. Each of the six domain teams arrived at a pared-down set of indicators, continued the discussion of test procedure, and began the task of outlining draft chapters. The teams were then tasked with further testing of the indicators, using the identified set of criteria with a goal of selecting one or a few indicators per domain.

The 8th Conference of the International Society for Quality-of-Life Studies (ISQOLS San Diego, California, December 2007) provided an opportunity for members of the ASI working group to present their narrowed list of Arctic social indicators for discussion and critique to an audience highly knowledgeable and practiced in indicators formulation. A workshop of domain team leaders was then convened in February 2008, to refine the indicator

selection based on feedback from the ISQOLS conference and to finalize report structure.

The International Congress for Arctic Social Sciences (Nuuk, Greenland, August 2008) then offered a venue for review of the indicators by a larger audience; each domain team presented its indicators one more time, and received feedback from a group of Arctic specialists. Final revisions to the sets and related report chapters were then completed in Fall 2008, with a subset of the ASI team leaders holding a writers' meeting in Nanaimo, British Columbia to finalize the report's format.

3.2 Criteria Used in Selecting Arctic Social Indicators

In creating a tractable set of social indicators for the Arctic, we were faced with choosing, from a large number of possible indicators, a small, manageable subset that were academically robust, user-friendly and straightforward to interpret (Ibrahim & Alkire 2007). While several criteria were initially considered against which to evaluate candidate indicators, six criteria were ultimately chosen for this purpose: data availability, data affordability, ease of measurement, robustness, scalability and inclusiveness. In Chapters Two through Seven of this report, the indicator or indicators selected for the domain are rated in terms of these criteria.

Data availability concerns whether the data that an indicator will use as a measure exists, and whether it is retrievable. A number of the indicators we considered could draw on data collected by national agencies. Other considerations in terms of availability included whether nationally collected data is comparable across countries, and whether the data is accessible in hard copy or electronic format from the collecting agency, or whether data could be compiled by researchers from other existing information. A further element of availability is the periodicity with which regularly collected data are gathered: to monitor human development in the rapidly changing socio-economic and environmental context of the Arctic, data collected on at least a five-year frequency was preferred.

We rated data availability as falling into three 'tiers'. Tier 1 indicates that the indicator is based on existing, regularly published data;

'Tier 2' designates that the indicator is based on data that would be produced by special tabulation from existing, unpublished data; and Tier 3 denotes indicators that would require primary data collection.

The criterion of *data affordability* considers the on-going costs of data collection and monitoring. Can the indicator (continue to) be measured at a reasonable cost? Indicators that can be garnered from data sets that are regularly collected, for example during government censuses, are more affordable than those requiring special tabulation or primary data collection. If new data collection is necessary, could the data be collected using no more than ten minutes of interview time? This criterion was used to rate indicators simply as affordable (✓) or not, though in the future it might be desirable to move beyond a bi-modal rating.

Ease of measurement takes into account how simple and straightforward the data is to measure in a broadly accepted manner. Here issues of whether the indicator measure is quantitative or qualitative, nominal, ordinal, interval or ratio, etc. are considered. For this criterion a subjective assessment of 'high', 'medium' or 'low' was made.

Robustness considers aspects of the temporal stability of the indicator over time. Will the indicator track changes over time? Will it remain stable, and relevant over time (for instance, not lose its significance)? This criterion also considers the sensitivity of the indicator – how responsive is it to change? Will it measure change over time? As with the data affordability criterion, we chose to rate an indicator as robust or

Housing in a residential area of the town Tuktoyaktuk, NWT, Canada.
Photo: Rasmus Ole Rasmussen



not robust. However, this is perhaps the criterion most requiring validation itself. As testing of the indicators is carried out, we will better understand the robustness of the various indicators we have chosen in the Arctic context. Radical political developments, extreme environmental changes, or severe economic transformations, for instance, could render some of our chosen indicators ‘non-robust’ in ways we have not anticipated.

Scalability is concerned with the extent to which the data used to measure the chosen indicator can be collected at different geographical scales. For instance, can the data be collected at the individual, household and community level? Can it be collected at the regional and national level? Language retention, for instance, can be measured at the individual level and aggregated up the different scales, where as per capita GDP or net migration cannot be measured below the community level. For each of five scales we indicated an ordinal ranking (1= scalable to individual, 2= scalable to household, 3 = to community level, 4 = to regional level, 5= to level of entire country). Scalability of course combines with availability – data may be able to be collected at lower scales, but is only collected, or only easily accessible at higher scales, due to cost, confidentiality issues, and other concerns.

Finally, we also considered the criterion of *inclusiveness* when selecting our indicators: in the case of Arctic social indicators, is the indicator inclusive of all sectors of the arctic population – male and female, indigenous and non-indigenous, rural and urban, etc. While a few of the indicators we chose focused on the indigenous Arctic population, we ensured that our indicators as a group addressed human development for the whole Arctic population.

Numerous other criteria have been applied in selecting social indicators, such as policy relevance, public resonance, lack of political bias, and so forth. Desiring a simple, limited list, we chose the six criteria noted above against which to review our indicators. Indicators were not eliminated if their rankings for the different criteria were not all optimal (e.g. ‘Tier 1’ for *Data Availability*, ‘V’ for *Data Affordability*, *Robustness* and *Inclusiveness*, ‘High’ for *Ease of Measurement*), and meeting all levels of

Scalability – ‘1-5’). The criteria rather provided a means by which to assess the indicators’ general tractability.

3.3 Structure of the Report

The body of this report comprises the six following chapters, which address the six domains identified for measuring and monitoring Arctic human development. The first three chapters, on Health and Population (Chapter 2), Material Well-Being (Chapter 3) and Education (Chapter 4) offer indicators for the three domains the ASI Working Group adopted and revised from the UN Human Development Index. The chapters explain why and how the domains themselves, as well as the indicators chosen, are appropriate adaptations of UN HDI domains and indicators. These chapters are followed by three chapters focused on the domains identified in the Arctic Human Development Report as particularly relevant and critical to well-being in the Arctic: Cultural Well-being (Chapter 5); Contact with Nature (Chapter 6), and Fate Control (Chapter 7).

Each of the six domain chapters provides a short introduction, defining and discussing the concept of the domain in general terms. Each then gives a quick overview of the domain in the Arctic context. The chapters provide a discussion of a larger candidate set of indicators that the domain team considered, then describe the selected indicators for that domain. A matrix is provided showing how the chosen indicators meet the set of criteria described above, followed by concluding comments. When more than one indicator was offered or an index proposed by a domain team, the authors were asked to identify what they consider the single best indicator.

In the final chapter (Chapter 8), the proposed indicators for each domain are collated. Data challenges for the chosen indicators are discussed, and potential abuses of indicators briefly identified, in the hopes that these will be shunned. The Arctic Social Indicators report then provides a set of six recommendations on the next steps for testing and validating the indicators and developing an Arctic monitoring system for social indicators. These recommendations intend to optimize the use of existing sources of data and data collection



Sea ice has started melting in Kulusuk, Eastern Greenland.
Photo: Johanna Roto

efforts, encourage cooperation and collaboration among the Arctic states, and articulate efforts to test, validate, refine and then monitor the indicators with extant and impending projects.

As the Arctic is undergoing rapid social, economic and environmental change, monitoring Arctic human development is critical to planning and policy development and recalibration. We hope that the indicators provide a small set of tractable measures for this monitoring. The work of the ASI constitutes a significant step forward in moving us toward an ability to track trends in key elements of human development in the Arctic and, as a result, guiding discussions regarding questions of policy.

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2 Health and population

Lawrence Hamilton, Peter Bjerregaard, and Birger Poppel

1.0 Introduction

Health and population are both important dimensions on the “minimum list” of indicators that United Nations experts have proposed for the statistical monitoring of broad areas of social concern (UN, 1996; also see UN, 1975 and UN, 1989). Indeed, most governments record health and population measures, which are important gauges for policy discussions. Health has obvious relevance both as an aspect of well-being and as an indicator of how successfully society is functioning to serve the needs of its people. Population may seem less obvious as an indicator of well-being, but it is such a fundamental dimension of human settlements in the North as elsewhere that few other indicators can be understood without it. Population size, rates of change, the contributions of births, deaths and migration, and other characteristics that result from these factors (age structure, sex ratio, and cultural composition) convey a wealth of information about a community’s current conditions and needs, along with its potential and path toward the future.

As the United Nations and countless other reports have demonstrated, many health and population statistics meet the practical criteria desired for Arctic social indicators. They are widely available from government statistical agencies, more so than for almost any other type of indicator. Further, because health and population statistics can be monitored over time at a reasonable cost in terms of labor and material

resources, time series often already exist for them, providing crucial data for Arctic applications in particular.

Although the prospects for separating health and population measures for indigenous and non-indigenous populations vary from place to place and from time to time (as do definitions of “indigenous”), many indicators tend to be relatively general and stable and are measured in a broadly accepted manner. Consequently, they support longitudinal analysis. Therefore, in thinking about indicators specifically for the Arctic, we can take advantage of decades of experience and research using similar measures elsewhere.

Two chapters in the *Arctic Human Development Report* (AHDR), “Arctic Demography” and “Human Health and Well-Being,” capably surveyed conditions and broad trends across nine sub-national regions: Alaska, Greenland, Iceland, Faroe Islands, and the Arctic regions of Canada, Norway, Sweden, Finland, and Russia (AHDR, 2004). The report revealed that there exist many social contrasts between these regions, or between them and larger societies to the south. But stark contrasts can also be found within each region. While these regions contain industrial/post-industrial cities such as Anchorage, Alaska; Reykjavík, Iceland; and Murmansk, Russia, which dominate the statistical picture, they also contain rural areas such as western Alaska, Iceland’s Westfjords, and Russia’s Chukotka. Many rural areas, in turn, contain communities ranging from regional hubs with



Children playing in the settlement Ukkusissat (near Umannaq), Northern Greenland. Photo: Birger Poppel

several thousand people and service-oriented economies to widely dispersed small villages of just a few hundred (or fewer) people with mixed cash-subsistence economies.

This chapter takes a step beyond the AHDR, examining issues related to scale that arise as we consider how to disaggregate health and population indicators for Arctic societies. The focus is on two dimensions of scale: human geography and time. This focus is critical because indicators that might function well enough to describe populations of hundreds of thousands and places where change is relatively gradual behave differently when applied to small and rapidly changing Arctic places. Even where the definitions of indicators remain the same, using them requires extra care in the Arctic.

Some prime social indicators for comparing nations or major sub-national units, such as life expectancy and fertility rates (or in other domains indicators such as literacy and gross domestic product), tend to be unavailable for smaller populations. Compromises, therefore, are necessary in developing a practical set of indicators for Arctic places. Indicators need to

be “good enough” and obtainable, rather than ideal but unobtainable.

Issues of scale can also force compromises. Statistical properties constrain how small a population any indicator can reasonably describe. Having indicators at the level of individual communities might seem attractive in principle, but these often prove too erratic to be usable in practice. Similarly, we need longer time series rather than single measurements in order to draw conclusions from indicators that change substantially from one year to the next. This chapter explores the compromises of indicator definitions and scale for the Arctic.

1.1 The Concept of Health and Population

The concept of individual health includes both physical and mental conditions. From the standpoint of social indicators, some of the most tractable manifestations are reports of physical ill health such as incident counts (re-expressed as rates) for specific kinds of illness, injury, or death. For each of these factors, a good-health mirror indicator theoretically could be defined, such as the proportion of people *not* ill or in-

jured – but that cheerful idea contains no additional information and would cost us in clarity and comparability.

Mental health is more difficult to assess directly than physical health, even at the individual level, but some behaviors provide observable proxies. For example, rates of suicide, teenage births, substance abuse, and even crime (especially violence and domestic abuse) have widely been interpreted as indicators of mental or social health. Rates of obesity also reflect both physical and mental health. Divorce rates and school completion rates might be considered as well, although their meaning as indicators can be ambiguous.

Most health indicators cross into the domain of population, if for no other reason than their definitions as rates require a population number in the denominator. But what number defines “population” when considering health indicators? The answer is derived from demographic data: sometimes it is the total population, but often it is a more distinct number drawn from detailed population data that consider breakdowns by age, sex, or ethnicity. Vital statistics, notably the number of births and deaths, are essential for health indicators such as birth or mortality rates. Further, some health statistics such as life expectancy are defined directly from population data. Population characteristics such as sex ratios, age structure, in- or outmigration, and rates of growth or decline reflect on community health rather than individual health, although they certainly have an impact on individuals. These same characteristics become even more informative when applied to ethnic, cultural, or linguistic subgroups within a population.

Population data are also generally required to interpret health indicators because most of them exhibit different rates across age and gender subgroups. A declining rate of crime or suicide, for example, may reflect improving social conditions. Alternatively, such a decline may simply be the result of an aging population due to the outmigration of youth (e.g., Hamilton and Butler, 2001).

The availability of health services within a population provides a different kind of metric. The number of physicians per capita and the availability of routine or advanced medical care,

vaccinations, health cost coverage, transportation to hospitals, and so forth reflect not health per se, but the scope of infrastructure promoting good health.

1.2 Overview of Health and Population in the Arctic

Several surveys and reports have sought detailed information on individual health, including self-reported or self-assessed health (for a meta-analysis of findings see DeSalvo et al., 2006). The SLiCA project has made the most geographically extensive application of survey research in the North, focusing on indigenous communities (Poppel et al., 2007; Kruse et al., 2008). Periodic national surveys conducted within most circumpolar countries offer detailed health information representing entire regional populations, not just indigenous peoples, although the national surveys generally are not designed for broad comparisons across nations. Among national surveys that include northern regions are the Canadian Community Health Survey (Statistics Canada, 2003; includes Yukon, Northwest Territories, and Nunavut), the Survey of Living Conditions (Statistics Sweden, 2006; includes Norrbotten and Västerbotten), the Behavioral Risk Factor Surveillance System (CDC, 2007; includes Alaska), and Health Behavior and Health Among Finnish Adults (Helakorpi et al., 2003; includes combined Oulun lääni and Lapin lääni).

One recent publication, *Health Transitions in Arctic Populations* (Young and Bjerregaard,

Children visiting a cruise ship in Greenland.
Photo: Birger Poppel





The island of Magerøya, in Nordkapp, the northernmost municipality in Norway. September 2009.
Photo: Jón Haukur Ingimundarson

2008), achieves a circumpolar synthesis of indicators from national studies covering health and demographic conditions by region (Alaska, northern Canada, Greenland, northern Fennoscandia, and northern Russia) and by selected indigenous groups (Inuit, Dene, and Saami). A report by Young (2008), derived from this book, provides tables, graphs, and maps and other information (including definitions, sources, and some risk factors) about circumpolar health indicators.

Most health studies focus on a particular region of interest, such as Greenland (e.g., Bjerregaard, 2003). Comparative pan-Arctic studies take a broader view, but in doing so must define their geographical scope of study, and there is no consensus on where the boundaries of the Arctic lie.

The Arctic Circle defines a light zone (southern extremity of the polar day and polar night) that ill suits the substantive interests of most research. For their purposes, hydrological scientists have defined instead a pan-Arctic region comprising all lands that drain into the Arctic Ocean and its adjacent seas (Arctic RIMS, 2008). This pan-Arctic watershed extends as far

south as Kazakhstan in Asia, but excludes most of Finland and all of Sweden. Social scientists writing the AHDR chose instead a geography defined by political boundaries marking off Arctic regions within the eight Arctic nations (or nine regions, counting Greenland and the Faroe Islands separately). The circumpolar health reports by Young (2008) and Young and Bjerregaard (2008) encompassed a geography similar to the AHDR. The SLiCA surveys took a different path again, focusing on selected and predominantly indigenous areas within northern Alaska, Canada, Greenland, Scandinavia, and Russia (Andersen and Poppel, 2002). Thus, the AHDR and Young and Bjerregaard considered Anchorage, Reykjavík, and Murmansk, for example, but SLiCA did not. Other studies have adopted definitions of their own.

It is clear that any definition of the Arctic is contingent on the observer's perspective and purpose, and in each definition there are places where the border may appear arbitrary. One way to address the dilemma of definition is to allow shades of gray: some places might be "more Arctic" (by any particular criteria) than others, but their differences are best viewed as

matters of degree, not of kind. We might ask, for example, not simply how Arctic places differ from non-Arctic places with respect to infant mortality, but how infant mortality rates vary together with other social indicators – and then test hypotheses about why this occurs. A less aggregated approach seeking indicators at smaller geographical scales within the AHDR's nine regions provides one possible way to evaluate competing explanations and to work realistically with the heterogeneity, gradations, and indistinct boundaries of Arctic societies.

2.0 Possible Health and Population Indicators in the Arctic

In theory, it seems desirable to collect positive health or well-being indicators. Despite widespread advocacy for positive indicators, however, there has been less evidence that they provide interpretable comparative measures in practice and few instances where they form long-running time series. For these reasons, our health indicators focus on rates of negative outcomes, as do those of most other studies (e.g., articles in Young and Bjerregaard, 2008 and in the *International Journal of Circumpolar Health*).

Mortality statistics are routinely collected and are among the most important of indicators. Overall death rates, and death rates within an age group (such as infant mortality, defined as deaths per 1,000 live births among infants less than one year old, or child mortality, covering children under five) have proven particularly valuable. Mortality rates by main cause of death, including suicide, accident, homicide, infectious disease, neoplasm, and other natural causes, could have broad applications on the evaluation of social or health policies.

Disease rates, such as the prevalence of tuberculosis, seem like obvious choices for health indicators, but diagnoses depend heavily on the quality of health care systems. For example, reported rates might be higher in one place because more people see physicians, despite objectively lower prevalence of the disease. Indicators for the quality of health care systems raise other challenges of comparison. We might want to know, for instance, what proportion of people live within one hour of free health care. Such indicators would require careful develop-



Students visiting
Ilmmarfik, the University
campus in Nuuk.
Photo: Birger Poppel

ment, however, as the true cost and quality of health care would be variable and difficult to define.

Self-rated health data can be collected along with other individual data on a survey without need for medical records. Such data provide a widely used and seemingly robust measure that has been validated as a predictor for life expectancy (DeSalvo et al., 2006). Tables 2.1 to 2.3, based on SLiCA data, illustrate how self-rated health can be analyzed together with other survey variables. It is difficult to know how people in different places distinguish between “excellent” and “very good” health, or between “fair” and “poor” health, but the tables show marked contrasts in responses by region or population groups (Poppel et al., 2007).

Survey data, unlike aggregated data on rates, permit testing hypotheses about multiple, individual-level predictors of health and other outcomes. This quality and the predictive efficacy of self-rated health make a good argument for expansion and routine replication of survey data collection. One drawback of subjective health reports is that they involve the respondent's comparison between his or her experienced and expected states of health. Thus, interpretation tends to be more straightforward across individuals at one particular place and time, but less so across nations or different periods of time.

Table 2.1: Self-rated health, by region (SLiCA)

	Canada	Greenland	Chukotka	Alaska	Total
Excellent	28%	19%	5%	15%	18%
Very good	27%	59%	10%	32%	38%
Good	33%	18%	34%	30%	26%
Fair	9%	4%	29%	20%	13%
Poor	2%	1%	23%	4%	6%
	100%	100%	100%	100%	100%

Source: Poppel et al., 2007.

Table 2.2: Self-rated health, by subregion (SLiCA)

	Nunavik	Labrador	Inuvialuit	Nunavut	Sydgrønland	Midtgrønland
Excellent	32%	22%	29%	21%	19%	21%
Very good	25%	38%	30%	27%	52%	58%
Good	33%	29%	29%	39%	26%	17%
Fair or Poor	10%	11%	12%	13%	4%	4%
	100%	100%	100%	100%	100%	100%
	Diskobugten	Nordgrønland	Østgrønland	Anadyr	Central	Eastern
Excellent	14%	17%	18%	2%	5%	5%
Very good	62%	67%	62%	0%	30%	16%
Good	17%	13%	18%	85%	42%	44%
Fair or Poor	6%	3%	2%	13%	23%	35%
	100%	100%	100%	100%	100%	100%
	Western	North Slope	NANA	Bering Straits	Total	
Excellent	4%	21%	13%	12%	18%	
Very good	2%	29%	29%	35%	39%	
Good	18%	29%	35%	27%	26%	
Fair or Poor	75%	21%	23%	26%	17%	
	100%	100%	100%	100%	100%	

Source: Poppel et al., 2007. Survey responses „fair“ and „poor“ are grouped to make the Canadian data comparable with other regions.

Table 2.3: Self-rated health, by gender (SLiCA)

	Male	Female	Total
Excellent	20%	18%	19%
Very good	45%	38%	42%
Good	25%	30%	27%
Fair	8%	9%	8%
Poor	2%	4%	3%
	100%	100%	100%

Source: Poppel et al., 2007.

Among the behavioral indicators, diet and alcohol/drug use are too difficult to measure and interpret to make them broadly useful. Violence is an important health-related issue, reported to some degree in crime and mortality statistics, but differences in reporting and classification systems make comparisons problematic. Obesity and smoking, on the

other hand, can be more simply defined and should make good indicators. Obesity must be measured at the individual level, whereas import statistics for tobacco could be a crude proxy for individual smoking behavior.

Health cannot meaningfully be measured with a single variable at all times. For example, throughout the 20th century, infant mortality was a useful overall indicator of health with special relevance for diseases related to nutrition, housing conditions, economic welfare and health care – the classical public health factors. Along with the epidemiological transition, infectious diseases lost importance and infant mortality continued to decline in most Arctic indigenous populations. Mental health became an issue, illustrated by the extremely high youth suicide rates from the 1960s until the present

day. Later still, lifestyle factors such as diet, physical activity, smoking, drinking, and drug abuse became evident as causes of chronic disease. In the 21st century, obesity and associated chronic diseases (cardiovascular disease, diabetes) are expected to become leading causes of death in the Arctic due to reduced physical activity and shifting dietary habits (Young and Bjerregaard, 2008).

Population statistics, even more than health, are widely collected by government agencies. Register statistics in Nordic countries, or census and between-census estimates of population in Alaska, provide time series of total population at spatial resolution down to the individual community level. Canada and Russia report population at coarser but still usable temporal/

spatial resolution. Time series of vital statistics (births and deaths) and of population age/sex structure, or age/sex/ethnicity, generally exist at coarse resolution. Each nation treats ethnic or cultural identity in different ways statistically, and even within nations both official and self-definitions shift over time, complicating the prospects for defining comparable ethnicity-specific indicators.

Where population statistics do exist we can derive other measures such as birth and death rates, including two important indicators: teenage birth rates and infant mortality. (As noted earlier, infant mortality is defined as deaths of infants under one year old, per 1,000 live births. Teenage birth rates are defined for particular age groups; e.g., the number of births to moth-

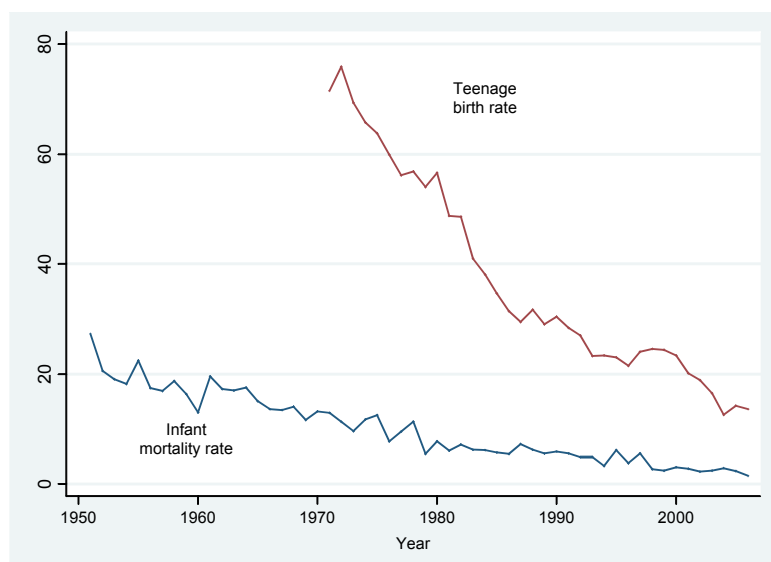


Figure 2.1:
Infant mortality rate (deaths per 1,000 live births) and teenage birth rate (births per 1,000 females age 15-19 years) for Iceland, 1951-2006.
Source: Statistics Iceland.

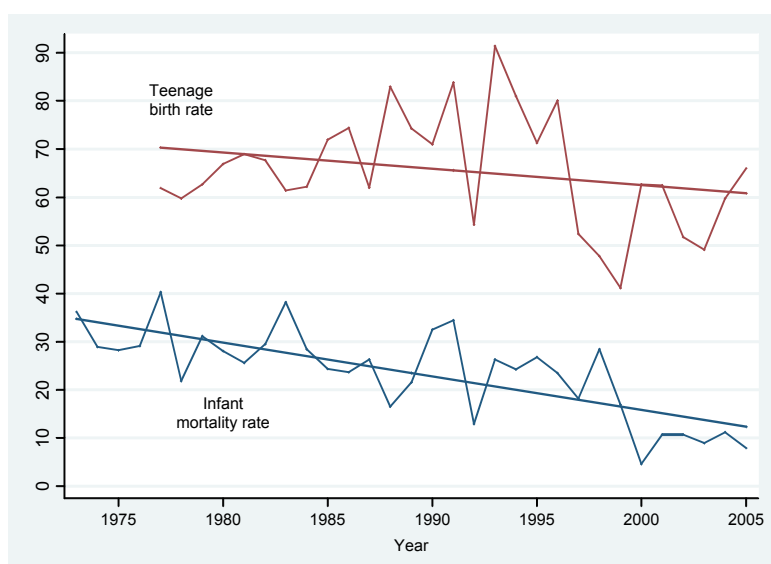


Figure 2.2:
Infant mortality rate (deaths per 1,000 live births) and teenage birth rate (births per 1,000 females age 15-19 years) for Greenland, 1973-2005.
Source: Statistics Greenland.

ers age 15 to 19, per 1,000 females in that age group). Figures 2.1 and 2.2 provide illustrations of these indicators in Iceland and Greenland. Figure 2.1 shows a clear downward trend in both series, indicating marked improvement in health and social conditions. Similarly, Figure 2.2 shows a decline in Greenland, but due to the smaller population base (around 50,000 to 57,000 in Greenland compared with about 150,000 to 300,000 in Iceland), the indicators fluctuate more dramatically from year to year. With these fluctuations and a window of less than three decades, the birth rate decline for Greenland appears less clear-cut than it does for Iceland. In fact, the upper trend line in Figure 2.2 is not statistically significant, meaning that these data are not sufficient to establish that any trend exists. The contrast between Figures 2.1 and 2.2 illustrates the challenge of looking at smaller scales of population and time. Indicators with a local focus, such as people in one Greenland municipality, or shorter time series, such as just a few years, require even more care when interpreting them.

Children playing on a sunny spring day in Tasiilaq, East Greenland.
Photo: Rasmus Ole Rasmussen

Rates of population growth or decline, sex ratios, and the fraction of population age 65 and older (or under 20) can be calculated as well. (For a look at some interconnections between these indicators and social change, see Hamilton, forthcoming.) Where in- and outmigration are not measured directly, net migration can be estimated crudely as the difference between population change and natural increase (number of births minus deaths). In the Arctic to a greater degree than elsewhere, net migration often dominates population structure and change. Life expectancy and fertility rates, widely used for international comparisons, are difficult to calculate at regional or subregional scales. Mortality and birth rates provide the most practical alternatives.

Ideally, the health and population indicators described here should be available on a subregional scale across most, if not all, of the places we might consider to be Arctic. Viewed with appropriate caution, subregional and even community-scale indicators could prove most important for seeing impacts of resource or envi-



ronmental change, which tend to manifest on local scales. Studies of northern fishing towns, for example, have noted substantial demographic effects following marine ecosystem change (e.g., Hamilton et al., 2003, 2004a-c, 2006).

Because so many Arctic places have experienced rapid change, annual time series are most helpful – particularly when the series extends far enough back to distinguish variability from trends. Breakdowns of indicators by age and gender would add much to our ability to read them. In many Arctic regions it is also desirable to draw ethnic or cultural distinctions, such as those between indigenous peoples and others. Defining indigenous status in a way that is both locally meaningful and widely comparable across nations presents a much greater challenge than defining age or gender, as the variety of ethnic, linguistic, place of birth, or ancestry-based approaches found in statistical records of different countries make clear.

Most indicators, such as infant mortality or teenage birth rates, require two numbers: a numerator (such as number of births) and a denominator (such as number of teenage females). In order to obtain rates for subgroups, group membership must be defined consistently in both the numerator and denominator. We would have to know, for example, the number of births to Alaska Native mothers, and also the total number of Alaska Native females in a particular age group, applying exactly the same definition of who is or is not Alaska Native in both cases. Moreover, the definitions should be stable over time. Similarly, to compare migration, mortality, accident, illness, or other rates across ethnic subgroups, we would need to know the ethnic identity (defined the same way as for population statistics, and the same way each year) of each person who moved, died, experienced an accident or illness of a particular type, and so forth. Precise data of this sort generally do not exist and are difficult to estimate reliably. Place of birth provides a useful, though far from perfect, proxy for indigenous identity in Greenland, but no similar proxy exists for indigenous peoples of Scandinavia or Russia. The US and Canadian censuses ask respondents to identify their own ethnicity, but these identifications do not necessarily carry

over to health records or other kinds of statistics. Moreover, a pattern called “ethnic mobility” has been observed in US and Canadian censuses, where individuals describe their own ethnicity differently at different times. A lack of comparable data limits how specific we can be when applying any particular indicator to smaller Arctic places or subgroups. Some demographic indicators scale down more smoothly than health indicators do.

In the next section we organize these thoughts into more compact lists of key indicators, along with their general definitions and possible sources.

3.0 Selected Indicators of Health and Population for the Arctic

A useful, general-purpose set of health indicators would include those listed below. At least one indicator within each of the three domains is needed in order to give a meaningful description of health.

3.1 Health Indicators

Classical indicators of public health and health care

Infant mortality: deaths of infants less than one year old, per 1,000 live births. Source: government vital statistics.

Child mortality: deaths of children less than five years old, per 1,000 live births. Source: government vital statistics.

Access to health care: percentage of population within one hour of transportation to health care, and with insurance or government arrangements to pay. Source: None available.

Mental health

Suicide rate: number of suicides per 100,000 people. Source: government vital statistics.

Self-assessed health: averages or percentages based on self-reports of the general state of health or existence of specific health problems. Source: population surveys.

Chronic disease

Obesity rate: percentage of population exceeding a clinical threshold for obesity, such as a body mass index (BMI) of 30 or higher

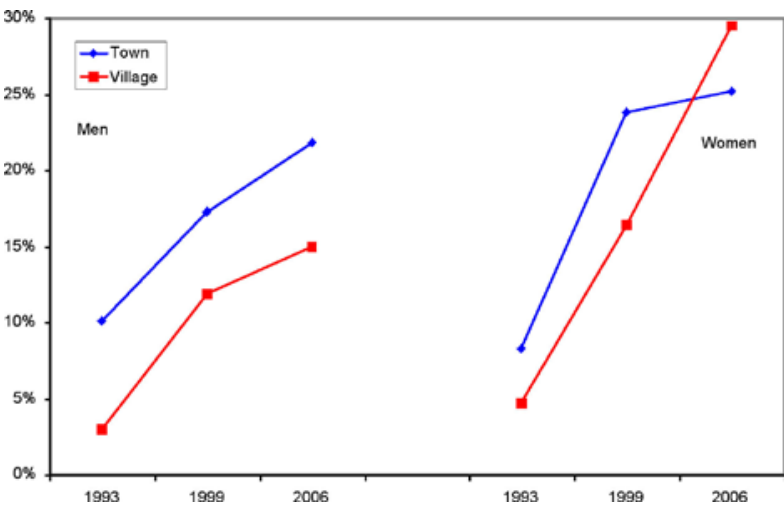


Figure 2.3:
Trends in obesity (BMI 30) rates among men (left) and women (right) in towns and villages (settlements) of Greenland according to 1993, 1999, and 2006 population surveys.
Source: National Institute of Public Health, Copenhagen

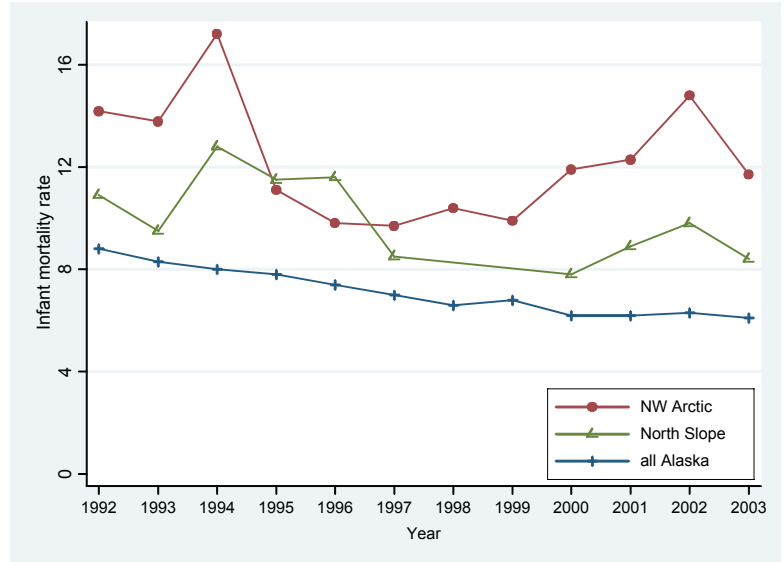


Figure 2.4:
Infant mortality rates (infant deaths per 1,000 live births) for two northern Alaska regions and the whole state.
Rates shown are five-year averages.
Source: Alaska Bureau of Vital Statistics and Alaska Department of Labour and Workforce Development; see Hamilton and Mitiguy (2008, 2009) for more examples and discussion of these graphs.

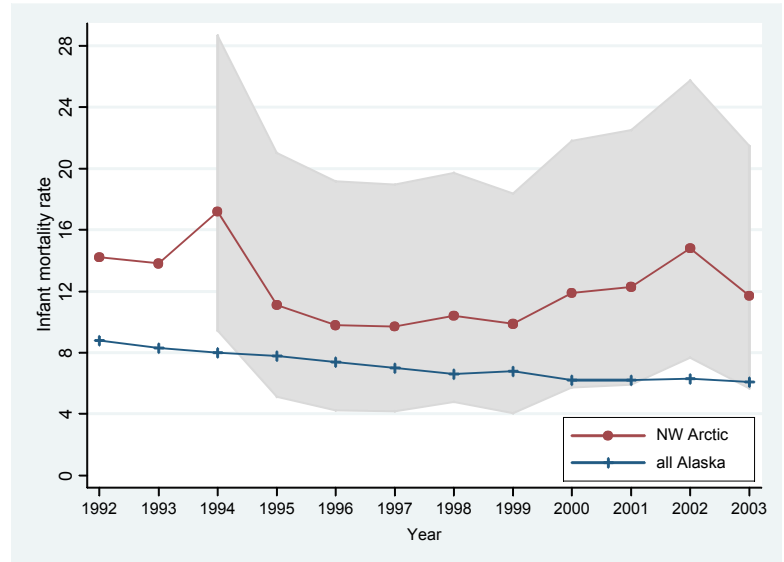


Figure 2.5:
Infant mortality rates for the northwest Arctic compared with all Alaska, showing 95% confidence interval for northwest Arctic rates.
Source: Alaska Bureau of Vital Statistics and Alaska Department of Labour and Workforce Development; see Hamilton and Mitiguy (2008, 2009) for more examples and discussion of these graphs.

(BMI = weight in kilograms/(height in meters)²). Source: population surveys.

Smoking rate: percentage of population currently smoking cigarettes or other forms of tobacco. Source: population surveys, or crudely approximated by tobacco product sales.

Each indicator would be particularly informative if it were broken down further according to age, gender, and ethnicity. With survey data such analyses are straightforward, and this is one of the main attractions of survey research methods. With other data sources, ethnic breakdowns in particular are difficult. Privacy and publication constraints are also at issue. Government vital statistics are collected initially with individual-level detail, but released to the public in aggregated forms that do not always permit subregional or subgroup analysis.

Figures 2.3 to 2.5 illustrate how several of these health indicators might be used comparatively; they also show what happens as we look at smaller places. Figure 2.3 depicts the rising prevalence of obesity among Greenland adults, based on survey data. This graph allows three comparisons: 1) obesity rates have been rising steeply; 2) rates among women have risen faster than rates among men; and 3) except for women in the most recent survey, obesity has been more prevalent in towns than in small settlements.

Figure 2.4 draws some comparisons of infant mortality, a key indicator of health. Infant mortality rates for all Alaska and for two predominantly Inupiat regions in northern Alaska (the Northwest Arctic and North Slope Boroughs), are graphed from 1992 through 2003. These are not annual data but rather five-year averages, which smooth out wild but statistically meaningless year-to-year fluctuations in the two northern boroughs. A downward trend in infant mortality appears clear for all Alaska, but less so for the North Slope (where two years are missing because there were too few deaths to calculate rates) and Northwest Arctic (which seems to go up, down, up, and down again). Overall, the infant mortality rates look higher in the two northern boroughs, but their trends and individual contrasts are uncertain.

Some of the numbers behind Figure 2.4 are small. For example, over the five years 2001 through 2005, there were only 10 infant deaths reported in the entire Northwest Arctic out of 852 live births to women living there. This yields a five-year infant mortality rate of $1,000 \times 10/852 = 11.7$, the value graphed for year 2003. But just two more deaths over these five years would have boosted the rate to 14.1, making the final trend appear definitely up. Two fewer deaths, on the other hand, would have dropped the rate to 9.4, an apparently steep decline.

Figure 2.5 graphs the all-Alaska and north-west Arctic rates again, but this time with shading to suggest the statistical uncertainty (calculated as binomial confidence intervals) of individual rates based on the Northwest Arctic data. The wide gray band in Figure 2.5 could equally well encompass a downward trend, an upward trend, or no trend. In most years it overlaps with the all-Alaska rates as well. Confidence intervals to express uncertainty are well-known tools for data analysis and add an essential perspective when interpreting social indicators from sparsely populated northern regions. In this instance, the statistical uncertainties should temper whatever conclusions we might draw from the simple rates of Figure 2.4.

3.2 Population Indicators

A similarly general set of population indicators would include the following (note that several key health indicators require population data for their definitions):

Total population: population living in a place at a selected time in one year. Source: population register, census, or statistical-agency estimate.

Number of births: number of live births in one year. Source: vital statistics records.

Number of deaths: number of deaths in one year. Source: vital statistics records.

Net migration: population change due to the balance of in- and outmigration. Source: population register, census, or survey.

All of these indicators are best in the form of time series covering many years and, where

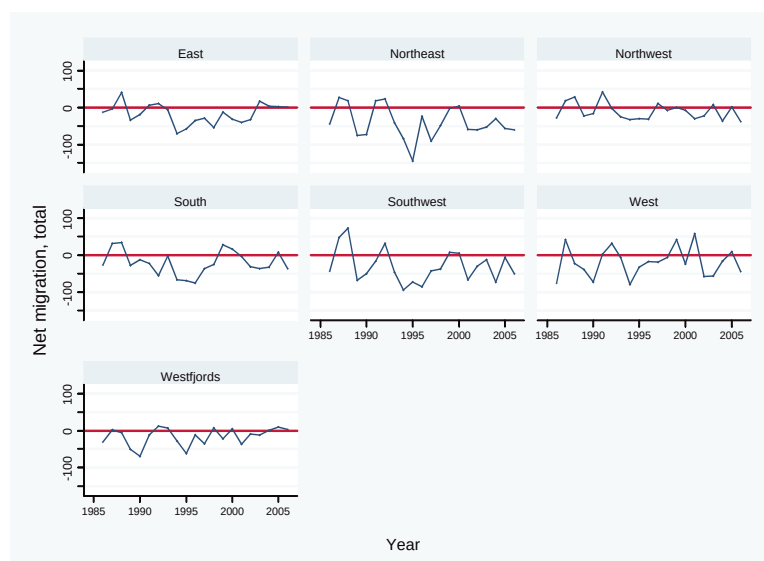


Figure 2.6:
Net migration for seven rural regions of Iceland,
1986-2006. Negative values indicate
net outmigration.
Source: Statistics Iceland.

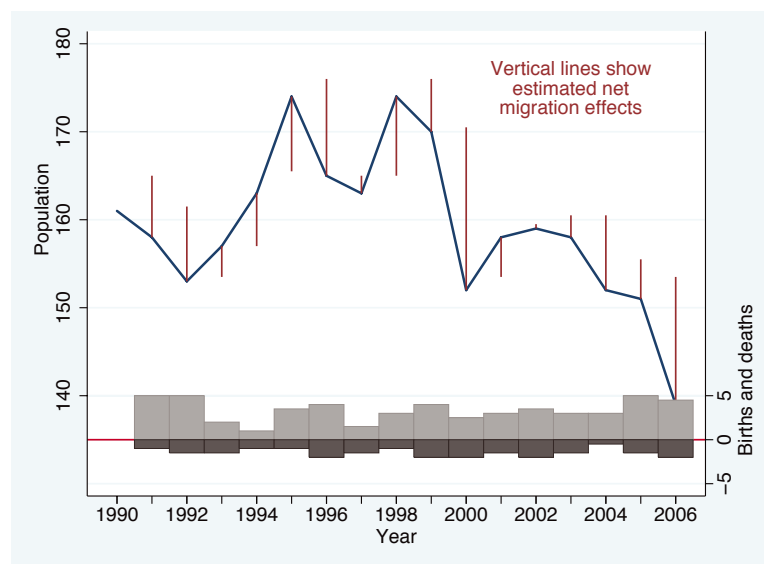


Figure 2.7:
Population and components of change for Wales,
Alaska, 1990-2006. Upper lines show total population and
estimated net migration-red segment above the main
curve indicates net outmigration, below the main curve
indicates net in-migration. Lower bars track the number of
births and deaths.
Source: Alaska Bureau of Vital Statistics and Alaska Department of Labor and Workforce Development.

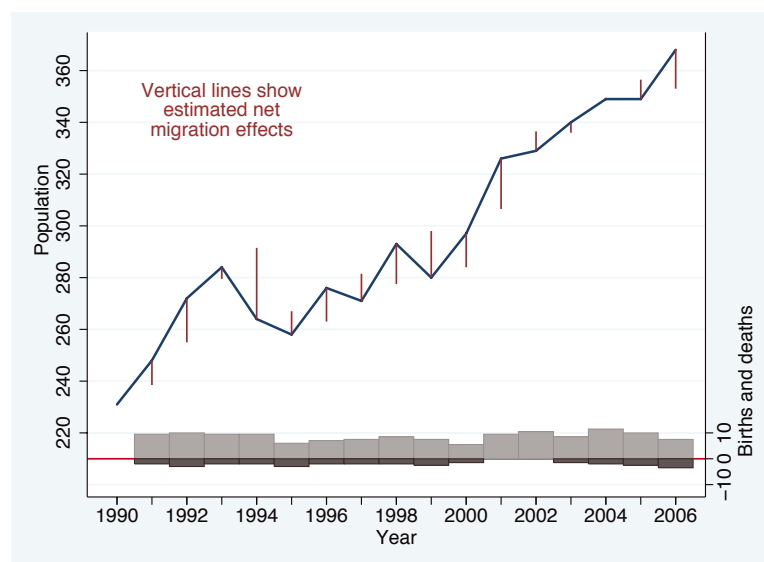


Figure 2.8:
Population and components of change for Koyuk, Alaska,
1990-2006. Upper lines show total population and estimated net migration, as in Figure 2.7. Lower bars track the number of births and deaths.
Source: Alaska Bureau of Vital Statistics and Alaska Department of Labor and Workforce Development.

possible, broken down by age, sex, or ethnicity. Secondary indicators derived from population numbers include birth rates, teenage birth rates, mortality rates, infant or child mortality rates, population growth or decline rates and projections, and age/sex/ethnicity composition of the population, including age and sex ratios. Each of these indicators has relevance to sustainability and socioeconomic development. For example, Saami leaders in Scandinavia have noted the need for better data to characterize specifically Saami populations (Nystø, 2007). Time series of population indicators compared across different places provide windows on the impact of major events such as a policy change or resource decline (e.g., Hamilton and Butler, 2001; Hamilton, 2007).

To advance beyond the AHDR, we seek indicators that can be compared for geographies more specific than the nine general regions. The term “place”, as used above, is deliberately vague, but for each indicator there are practical constraints on how small the geography can be. One obvious limitation is data availability. Statistical agencies do not provide breakdowns below certain minimum thresholds of population counts. Although specific thresholds vary from country to country, they sometimes (as typically is the situation in Canada) preclude the release of accurate data on small Arctic communities, or make the released data a patchwork of true and artificially rounded or suppressed numbers. Communities with populations of a few hundred or a few thousand people can be of great interest to social science and policy makers, but social indicators on this scale must be interpreted with care.

Besides data availability, another size constraint arises from the statistical variability associated with small samples. Percentages based on a random sample survey of 100 people, for example, will have confidence intervals – what opinion polls call the “margin of error” – on the order of 10%. Thus, if a health survey determined that 20% of the adults interviewed in one place were obese, we could conclude with confidence only that the true proportion was somewhere between 10% and 30%, making the detection of differences between places or over time unlikely. Certain health indicators such as mortality rates must

employ even smaller numbers because the yearly deaths among small populations are few, and fewer still if we look at age or other subgroups.

For region-wide or Arctic-wide coverage, it appears that the smallest practical scale for most indicators requires populations of at least several thousand and administrative boundaries that have remained stable over the last decade or more. Alaska, for example, can be subdivided into 27 “county-equivalent entities” such as boroughs, census areas, and municipalities. Any further subdivision into individual communities creates trouble with data availability, statistical reliability, and boundary issues. Similarly, it works reasonably well to subdivide northern Canada into census divisions, Greenland into municipalities, Iceland into regions, Norway into counties, Sweden into regions, Finland into regions, and Russia into oblasts and other administrative subdivisions. More problems arise if we attempt further division toward local scales, while maintaining Arctic-wide coverage.

Population indicators at small scales such as individual communities cannot achieve Arctic-wide coverage, but they remain valuable for comparing results from one in-depth case study with others, or with known larger-scale patterns. Figures 2.6 to 2.8 show examples of key population indicators applied at subregional and community levels.

Net migration has particular importance for Arctic places, where the arrival of newcomers or departures of local young adults can quickly reshape community life. Figure 2.6 graphs net migration from 1986 to 2006 for each of Iceland’s seven rural regions (excluding only the capital area around Reykjavík). Each small plot shows its own pattern of year-to-year fluctuations, somewhat correlated across regions. No general up or down trend appears, but all seven plots show more years with negative values – indicating more people leaving than moving in. Given the total populations of 7,000 to 29,000 in each region, it is not surprising to see large fluctuations year to year, often going from negative to positive and back again. These fluctuations underline why we should not read too much into values from a single year, or from just a few years.



Mountainbikers resting in
the harbour of Sisimiut.
Photo: Birger Poppel

With such cautions in mind, population indicators might remain usable at smaller scales than most health indicators because they are defined from larger numbers. Figures 2.7 and 2.8 visualize several key population indicators for Wales and Koyuk, two predominantly Native villages in Alaska's Nome census area. The graphs depict total population, estimated net migration, births, and deaths. The population of Wales peaked in the mid-1990s, but then fell so that by 2006 it was 13% below its 1990 level. Koyuk, in contrast, grew by 59% over this same 17-year period.

The two graphs also reveal something about how these changes happened. In both places, births exceed deaths, which by itself should drive population upward. In Wales, however, relatively large net migrations were the main control on year-to-year change. Net migration was most often negative, more than offsetting the excess of births over deaths. In Koyuk, on the other hand, migration played a weaker role. Without net outmigration, the steady excess of births over deaths drove the total population upward, from 231 in 1990 to 368 in

2006. In some places a rising population would signal economic growth, but that is not necessarily the case in rural Alaska. The causes and implications of such different social conditions in two villages within the region raise questions for future research. Figures 2.7 and 2.8 visualize several key population indicators for Wales and Koyuk, two predominantly Native villages in Alaska's Nome census area (for more discussion of the graphing methods and other examples, see Hamilton and Mitiguy, 2008, 2009).

4.0 Concluding Comments

Quality of life is not one dimensional. Even using the simple summaries of social indicators, we get a much better picture looking at multiple indicators, comparing them across places and times. If we nevertheless had to select just one indicator for health, infant mortality seems the best choice as this measure relates directly to quality of life and people's sense of well-being. It integrates a wide range of health-relevant conditions including health infrastructure, sanitation, nutrition, behavior, social problems, and disease. As well, international comparisons have established its broad validity as a proxy for societal development and its influence on other dimensions such as fertility and women's work. Finally, infant mortality rates are clearly defined, comparable, widely available, and include data for time series and subregional scales.

One drawback to using infant mortality rates is that they are based on small numbers. This drawback is shared by other health indicators, however. It constrains the possibilities for applying health indicators at subregional or community levels, or with time series, because any statistics become less stable as sample sizes decrease. Confidence intervals help to describe the range of uncertainty surrounding a given indicator value.

Choosing a single indicator regarding population or demography is also difficult. Population size, rates and components of change, and composition all are significant. One demographic indicator of particular importance to Arctic communities has been net migration. Outmigration by young adults can make places economi-

cally and culturally less viable. Conversely, proportionately large in-migration may signal economic strength, but it also places pressure on traditional ways of life. Both in- and outmigration reflect the current local sum of various push and pull factors, although we often need local knowledge to understand how. Like infant mortality, net migration thus integrates different forces and tells us something basic about where one place is heading or how it compares with others.

Interpretation of migration rates depends on their broader context. For example, many Arctic places have experienced in-migration of workers for mining or other resource development. Positive and increasing net migration in those instances signals industrial development and potential economic prosperity. Net migration could signify other things in a different context, however. Young adults often leave small Arctic communities to get an education, thereby contributing to net outmigration. This might signal a trend toward stagnation and depopulation, but it is also possible that those who leave for education and later return could ultimately enrich home communities. Conversely, a lack of outmigration could indicate that conditions are good in the home community or, alternatively, that residents feel unprepared or unable to move away. Thus, net migration is by no means a self-contained social indicator, and it must be interpreted carefully before drawing any policy conclusions. Time series following changes through many years, together with other kinds of statistical and qualitative information, would give a clearer picture of migration's real meaning.

With such cautions in mind, migration and other demographic indicators remain usable at smaller population scales than most health indicators insofar as they are calculated from a larger fraction of those populations. Demographic time series at subregional and community levels are widely available and provide a picture of human dimensions and dynamics that prove helpful in an understanding of many other social phenomena. Other components of population change (births and deaths), as well as population composition (age, sex, and ethnicity) add critical details to the demographic picture. The demographic background is

often essential for interpreting other indicator domains and weighing policy options.

Although these are good indicators, they remain far from perfect, and their application is not trouble-free. Inevitably, the reported values contain errors from various sources, and they differ across time and places in completeness. For many purposes, the register-based information systems of Nordic countries seem most complete, but they do not describe ethnic subgroups well. Statistics for Alaska are sensitive to ethnic identity but also tend to be estimated with more error and have limited resolution in time and space. The Canadian government collects detailed statistics for its own purposes, but is much more restrictive than other countries about publishing their data or permitting others to synthesize Canadian information into new datasets. The varied ownership and organization of Russian statistics, along with discontinuities through post-Soviet history, present challenges to research as well. Surveys have the attraction of being self-contained in that they ask for all the needed information at once, but their generalizability and

Elders at a confirmation party in Qeqertarsuaq.
Photo: Birger Poppel



Table 2.4: Health and Population Matrix

Indicator	Data Availability	Data Affordability	Ease of Measurement	Scalability*	Inclusiveness
Infant mortality rate	Tier 1	X	High	4-5	X
Child mortality rate	Tier 1	X	High	4-5	X
Access to health care	Tier 2	X	Medium	3-5	X
Suicide rate	Tier 2	X	Medium	3-5	X
Self-assessed health	Tier 3	--	Medium	3-5	X
Obesity rate	Tier 3	--	Medium	3-5	X
Smoking rate	Tier 3	--	Medium	3-5	X
Net migration	Tier 1	X	High	3-5	X
Total population	Tier 1	X	High	3-5	X
Number of births	Tier 1	X	High	3-5	X
Number of deaths	Tier 1	X	High	3-5	X

Notes: Tier 1: based on existing published data

Tier 2: data that would be produced by special tabulations from existing unpublished data

Tier 3: would require primary data collection

- 1 – scalable to individual; 2 – scalable to household; 3 – scalable to community 4 – scalable to region; 5 – scalable to country

validity can be problematic. Despite such challenges, however, the health and population measures outlined in this chapter are among the most available and comparable of all social indicators. (Table 2.4 provides an overview of how key indicators fare against selection criteria.)

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3 Material well-being in the Arctic

Joan Nymand Larsen and Lee Huskey

1.0 Introduction

Material well-being of a place can be defined as a measure of local residents' command over goods and services. In constructing its Human Development Index (HDI), the United Nations uses gross domestic product (GDP) – a monetary value of all goods and services produced in a given year – as an indicator of material well-being. But while GDP is an accepted measure in countries throughout the world, its usefulness in the Arctic is questionable.

The *Arctic Human Development Report* (ADHR) describes three main sectors of the Arctic economy: formal, transfer, and subsistence (AHDR, 2004). The size and importance of the transfer and subsistence sectors are critical parts of what distinguishes the economy of the Arctic region from other economies. Throughout this chapter we use the terms “informal,” “subsistence,” and “traditional” interchangeably to refer to the same sector of the economy. While GDP may correctly assess the production of a region's market sector, ignoring the important transfer and traditional components of the Arctic economy will give a false picture of the material well-being of an Arctic region. For the Arctic we need an alternative to GDP as a measure of material well-being: a social indicator that reflects all three sectors of the Arctic economy. To meet the challenge of devising a valid indicator, we need to account for all of the three main sources of real income that contribute to the region's material well-being.

The objective of this chapter is to construct a measure of material well-being that captures and more accurately reflects the special nature of the Arctic economy. The chapter begins with a discussion of the concept of material well-being. This is followed by a description of the organization and structure of the Arctic economy, and then a definition of material well-being within the context of the Arctic region. Based on this definition, a set of indicators is constructed and evaluated in terms of various criteria for assessing their strengths and weaknesses.

1.1 The Concept of Material Well-being

Material well-being is just one aspect of overall well-being and is not the same as happiness or well-being in general. Indeed, a brief look at happiness and well-being provides a useful point of departure in the discussion of the concept of material well-being.

There is some general agreement among researchers about what constitutes the key elements of overall well-being, namely physical well-being, material well-being, social well-being, development and activity, and emotional well-being. These elements may also be referred to as physical health, income and wealth, relationships, meaningful work and leisure, and personal stability (McAllister, 2005). Easterlin (2001) takes the terms “happiness, utility, well-being, life satisfaction, and welfare to be interchangeable,” and according to McAllister (in Venn, 2007), the many different definitions of



Town of Akureyri, summer 2009. Stream of foreign tourists heading back to cruise ship in the harbour.
Photo: Jón Haukur Ingimundarson

well-being can be summarized as something that “...comprises objective descriptors and subjective evaluations of physical, material, social and emotional well-being, together with the extent of personal development and purposeful activity, all weighted by a set of values.”

At a more theoretical level, the question of well-being is also considered in welfare economics and is measured in terms of what economists refer to as a social welfare function. In their technical language economists characterize each individual’s choices by the respective utilities of the options available to them. Social welfare is judged as an aggregate function of the levels of utility across society, where utility in basic terms refers to the satisfaction we obtain from goods, services, and leisure time. In theory, the determinants of utility may be quite general, reflecting a range of material and non-material influences, while in practice we tend to assume that the level of income or consumption is the most important determinant. At an aggregate level, and as we discuss later, measures of total income or GDP are often used as a proxy for social welfare, extending beyond a mere consideration of material well-being. This often

misplaced application of GDP has only added to the general criticism of its use.

International evidence casts some doubt on the relationship between material production and happiness. One of the most widely quoted papers in research on happiness and human well-being is probably the article “Does economic growth improve the human lot? Some empirical evidence” by Easterlin (1974), which suggests that individual happiness appears to be the same across poor countries and rich countries, and that economic growth does not seem to raise well-being. Easterlin proposes that we think of people as getting utility from a comparison of themselves with others close to them (Venn, 2007). Over time, happiness appears to be relatively unrelated to income, and Layard (2005) argues that relative income – income relative to other inhabitants of a region or community – is more important in explaining well-being than absolute wealth because as individuals and societies grow wealthier, they adapt to new and higher living standards and adjust expectations upward.

The finding that human well-being appears to be relatively unrelated to income is an important aspect of the critique that led to the con-

struction of the HDI by the United Nations. This point was also brought forward in the AHDR (2004), although that publication did not attempt to construct an HDI for the Arctic. It is widely accepted that analyses of economic development or progress that only take income into account neglect other important determinants of well-being. Objective measures of well-being have been summarized by McAllister (2005) as measures that relate to material and social circumstances that may foster or detract from well-being, such as housing standards, income and employment, educational attainment, and poverty. (Later in this chapter we discuss material well-being with reference not only to income but also to housing standard, subsistence harvest, migration, and more.)

We define material well-being in the Arctic region as some measure of local residents' command over goods and services. That is, material well-being is not happiness or general well-being, but in its strict sense "material." It is a measure of what is consumed, not what is produced. It should also reflect both the quantity and the quality of goods and services residents of a region consume. Possible indicators for these basic necessities can be defined in terms of basic housing, food security, and health care.

But material well-being is not only derived

from the things that people buy; in the Arctic region material well-being comes from employment income as well as public services and traditional activities. It may also reflect residents' prospects for the future. Indicators for such future prospects could be thought of in terms of 1) access to opportunities and 2) the future of the region's productive capacity. In Arctic regions, access to opportunities includes both labor market and subsistence or traditional activities. Future productive prospects might be measured by availability of human capital, as well as the structure and control of economic activity and instability of production.

1.2 Overview of Material Well-being in the Arctic: The Market and Subsistence-based Arctic Economy

The Arctic presents a special case when constructing and measuring material well-being. In the Arctic, material well-being is derived from market and non-market activity as well as transfers from higher levels of government. The importance of the traditional and transfer sector to material well-being is what makes the Arctic economy unique.

It is important to keep in mind that not only is the Arctic economy unique when compared with more industrialized regions, the Arctic as a whole is not a homogenous economic region.

"Brædtet" – the local marketplace for hunting and fishing products in the village of Alluitsup Paa, South Greenland, a village with 319 inhabitants (2009).

Photo: Sigrid Rasmussen



While regions throughout the North share characteristics that distinguish their economies from non-northern regions, they also vary significantly: by the type, quality, and quantity of industrial resources produced; by the importance of the indigenous population and the local economy; and by the different national economic and political systems.

These variations in regional economies complicate the task of devising appropriate indicators of material well-being for the Arctic. Here we briefly examine the main characteristics and the unique structure of the Arctic economy, which provide the context for constructing a valid indicator of material well-being.

As described in the AHDR, the economy of the Arctic is divided into essentially three major parts: the formal economy (industrial sector), the non-market informal economy (traditional or subsistence sector), and the transfer sector. The importance of each of these parts varies throughout the Arctic region.

1.2.1 Formal Sector

The formal and industrial segment of much of the Arctic economy is characterized by a narrow resource base, the extraction primarily of

non-renewable resources, and production that is often highly capital intensive and thus frequently requiring the import of capital from outside the region. Some areas of the Arctic, however, are more diverse than others. In the Fennoscandinavian Arctic, for example, formal economies are more diversified with a greater share of manufacturing production.

A significant share of the wealth created through large-scale resource extraction often does not remain in the Arctic or benefit the residents of the region. Rather, large-scale exploitation activities are frequently carried out to supply markets outside the Arctic using labor and capital inputs from outside the region (AHDR, 2004). A significant share of GDP is generated in the form of resource rents and return to capital and may leave the area when capital ownership is located outside the region. So while Arctic GDP is high throughout much of the North, it may not accurately reflect what is actually available for consumption and investment in the region. As a consequence, these resource flows in and out of the region limit the use of GDP as a measure of material well-being.

Also, the narrow resource-based economy is

The town of Honningsvåg, on the island Magerøya in Finnmark, Norway, 2009.
Photo: Jón Haukur Ingimundarson



a major source of economic vulnerability and instability in the region (Larsen, 2004). Significant fluctuations in earnings may result if production is concentrated in one or a small number of products and if exports are geared only to a few external markets, as is often the case in the North. These fluctuations make any one-year estimate of GDP a poor indicator of long-term well-being of the residents of the region. Not all Arctic regions depend on large-scale extraction of natural resources and external trade of course, but for those that do, material well-being will be affected by the nature and size of these activities, and the true effect may not be well reflected in the size of per capita GDP.

1.2.2 Informal Sector

While large-scale resource extraction is a central characteristic of the Arctic formal economy, subsistence in the form of customary harvesting continues to play an important role. The extent of this informal activity varies between and within regions of the Arctic.

Subsistence activity can be described as local production for local consumption. A significant number of indigenous people throughout the Arctic continue to depend largely on harvesting

and the use of living terrestrial, marine, and freshwater resources. Many of these resources are used as food and for clothing and other products. They also figure prominently in the cash economy of local households and communities.

Outside of the urban areas indigenous people often mix activities of the formal sector (e.g., commercial fish harvesting, oil and mineral resource extraction, forestry, and tourism) with traditional or subsistence activities, which include harvesting a variety of natural renewable resources to provide for human consumption.

The indigenous share of the overall Arctic population was estimated in the AHDR as approximately 10% for the region as a whole: 16% of the Alaskan population, 50% of the Canadian Arctic population, 88% of Greenland's population, and less than 5% of Russia's and northern Scandinavia's population (AHDR, 2004). These population statistics, combined with survey statistics on participation in the informal sector, show the importance of subsistence activities. For example, the SLiCA survey, covering Greenland, Chukotka, Alaska, and Canada, has shown that subsistence harvest is important to a large segment of the indigenous

Smelting of nickel ore in Monchegorsk, Kola Peninsula, Russia.
Photo: Rasmus Ole Rasmussen





Bringing home the new
Skidoo on dog sledge,
Kulusuk, East Greenland.
Photo: Johanna Roto

population. Half the households in the SLiCA survey reported, they harvested half or more of their family's meat consumption, and that for two-thirds of the households traditional food accounted for half or more of their household's consumption. (The continued importance of sharing subsistence foods accounts for the difference in these proportions.) The importance of subsistence harvest in the Arctic emphasizes the need to include this aspect of the Arctic economy in a measure of material well-being. Even when the traditional activity is less important in providing real income, traditional pursuits maintain cultural significance.

New threats and challenges to indigenous social and cultural sustainability have appeared, most of them fuelled by an increasingly rapid pace of externally forced, disruptive social change such as globalization and urbanization (AHDR, 2004; ICARP II 2005). Climate change, particularly global warming, will likely increasingly impinge on both subsistence and commercial wildlife harvesting and fishing, with serious

implications for local and regional economies, traditional diet, and cultural identity (ACIA, 2005). It is projected that there will be significant impacts on the availability of key subsistence marine and terrestrial species as climate continues to change, and the ability to maintain one's material well-being may be affected and may necessitate adjustments in hunting and harvest strategies as well as reallocations of labour and other resources.

While data do not exist on the impact of change on material well-being, the SLiCA survey has shown that in the case of Greenland the majority of survey respondents had a very easy or fairly easy time making ends meet, while the majority of respondents in Chukotka answered that they had some or great difficulty making ends meet. In Alaska about half of the SLiCA respondents found it very easy or fairly easy, and the other half found it difficult (SLiCA, 2007).

Overall, global change impacts in the Arctic pose the question of whether a robust indicator

that captures these changes both in the formal as well as informal sectors can be constructed.

1.2.3 Public Sector and Government Transfers

Lastly, the Arctic economy is also characterized by a large service sector, with the public sector accounting for a significant share. The tertiary sector accounts for between one-half and three-quarters of the total economic production in the Arctic, and dominating this sector is public administration (AHDR, 2004). In the case of Greenland and Nunavut, for example, annual block grant payments from Denmark and Canada make up a major share of revenue and help finance a large public sector with a significant public administration. Such government transfers impact local material well-being in a number of ways. Transfers create jobs in the public sector as well as the local non-profit or social economy. Transfers also subsidize the cost of providing local services such as utilities, education, and housing. Transfer payments are an important source of material well-being.

In summary, the Arctic economy provides the basis for the material well-being of Arctic residents. While the economic base varies throughout the North, Arctic economies share four important characteristics that are different from non-northern economies that must be captured by any measure of material well-being. First, residents of the North gain command over goods and services through market work, work in traditional activities, and government transfers. Second, the relative importance of each of these sectors varies throughout the North. Third, because of the capital and skill-intensive nature of industrial resource production, much of the value produced in this sector becomes payment to people outside of the region. Finally, climate change and globalization are likely to increasingly affect Arctic economies.

2.0 Possible Indicators of Material Well-being in the Arctic

What would make a good indicator of material well-being? The perfect indicator would tell us exactly the level of consumption from all sources

for the average citizen of an Arctic region. It would allow us to measure both the distribution of this consumption and the history of change, and it would allow us to compare across regions and over time. Unfortunately, the perfect indicator may be too costly to construct. In selecting the appropriate indicator we need to balance or trade off the information it provides with the cost of constructing it.

Several of the indicators we suggest here have weaknesses related to availability of data, affordability, and scalability and applicability to both indigenous and non-indigenous inhabitants of the Arctic. An indicator should be the most accurate statistic for measuring both the level and extent of change in the social outcome of interest. It should adequately reflect what it is intended to measure, and ideally there should be wide support for the indicators chosen so they will not be changed regularly. It is critical that the chosen indicators be consistent over time and across places, as the usefulness of indicators is related directly to the ability to track trends over time and compare the well-being of regions.

Data need to be collected and reported regularly and frequently to ensure they provide timely information. Any differences in data protocol in the Arctic will complicate the task of making comparisons across the region. But practically, we know that we will need to consider a number of possible trade-offs when selecting the best indicator among a set of possible indicators. The best measures may not be collected frequently to allow yearly comparisons. Our desire for longer time series rather than single measurements may be compromised if the measure changes substantially from one year to the next. Also, if the measure is collected by survey, the sample size may be too small, making a chosen indicator less reliable and with some data being unavailable for smaller regions. All this means that we may need to make compromises if we want to achieve good indicators that are obtainable at a reasonable cost in terms of time and resources. Such compromises may come at the cost of constructing an ideal, yet probably unattainable, indicator.

The chosen indicators should do well in terms of selection criteria such as data availability, affordability, ease of measurement, internal valid-

ity, robustness, scalability (household, local, regional), and inclusiveness of indigenous and non-indigenous populations. In the following sections a number of indicators are proposed and analyzed using the criteria for selection—from the most commonly accepted standard measure of material well-being, namely GDP, to several alternative standard measures that may prove to be more appropriate for the Arctic.

2.1 GDP as a Standard Measure of Material Well-being

The most common measure of the size of the formal economy is GDP, which is the monetary value of all goods and services produced in a given year. GDP has been widely used and is commonly accepted as a measure of material well-being throughout the world. The real GDP per capita is generally used as the core indicator in judging the position of the economy of a country over time or relative to that of other countries. Real GDP accounts for differences in price level between two points of comparison, time periods or places.

However, GDP has well-known drawbacks as a measure of well-being when it is intended simply as a measure of an economy's output. GDP was never intended as a measure of social welfare, but in the strict sense is simply the total value of recorded goods and services that are produced in a given year. This is true for all economies including those in the Arctic.

For many decades, the implicit and explicit interpretation of GDP as a proxy of social welfare has received much criticism, from Galbraith (1958) to Dasgupta (2001) and many others in between. In response to this general criticism, the United Nations HDI has become a widely accepted alternative to GDP as a measure of social welfare and standard of living in countries throughout the world.

Beyond this general criticism, the Arctic poses additional questions about using GDP since material well-being there is derived from more than just formal and recorded economic activity. In fact, the AHDR discusses the limitations of using the GDP in the setting of the Arctic:

Calculations of the HDI over a number of years have shown how a broader measure

of human development diverges significantly from GDP per capita beyond a relatively modest income level. This is a finding of obvious importance. In an era in which escalating levels of material consumption constitute a major source of large-scale environmental problems, the realization that human well-being does not correlate with GDP per capita beyond a certain point is both critical and encouraging... Many Arctic residents – especially those who are indigenous to the region or long-term residents – associate a good life with maintenance of traditional hunting, gathering, and herding practices. Yet it is the difficult to use indicators like GDP per capita to measure the health of subsistence systems or mixed economies more generally. For many, well-being is to be found in a way of life that minimizes the need for the sorts of material goods and services included in calculations of GDP per capita (AHDR, 2004).

When applied to the Arctic context, there are several problems with a standard measure of material well-being such as GDP per capita. These problems are related to the region's small scale, its resource dependence, the importance of subsistence, and the significant outflows of resource rents and inflows of transfers.

First, the GDP measure simply covers activities and transactions that have a market price and excludes non-market activities and household production. This drawback has long been recognized and emphasized as a limitation in using GDP as a measure of social welfare. While non-market activity is present in all economies – not just the Arctic – it tends to be relatively small and generally very scattered, and attempts to measure its size are complicated by the time and resources that this task would require. As highlighted earlier, subsistence is widespread and important to a significant share of the Arctic population, with participation in subsistence activities being a prominent part of daily living in some regions and directly affecting material well-being of a large number of Arctic residents. Yet, this non-market activity is not counted in GDP. We could ignore the traditional economy in a measure of

material well-being only if it was similar everywhere and was not likely to change. But the size of the informal economy relative to that of the formal economy may change considerably over time, fuelled by climate change, globalization, and other socioeconomic forces. A reduction in subsistence harvest would reduce material well-being for many indigenous communities, assuming that wage employment and transfers are unchanged. This, however, would not be captured by GDP calculations, and hence, excluding subsistence harvest will underestimate material well-being for many, resulting in an invalid measure.

A second problem is that GDP does not discount for flow of resource rents and payment to non-resident workers or flow of income to residents from outside the region. Nor does GDP account for transfers and taxes in and out of the region. Since a large part of GDP in the Arctic comprises returns to fixed capital and resource rents that can be taken out of the region as income to owners situated elsewhere, it is hard to know what part of GDP is available for consumption and investments and, in turn, what the impact is on material well-being. GDP tends to overestimate material well-being when it includes profits and rents that are not retained within the region and underestimate it by ignoring transfers from outside the region.

Third, GDP ignores the distribution of income, which Sen (1976, 1979), for one, considers as the main objection to using it. An unequal distribution implies unequal opportunities for personal development and well-being, and using GDP per capita as a measure of welfare means ignoring information on distribution of income and hence inequality. This is clearly an important drawback in the construction of indicators designed to help track human development and well-being in the Arctic. While GDP per capita may be high, it does not reflect well the actual size of income remaining in the Arctic, nor does it show how that income is distributed. Income is often highly unequally distributed, with personal income being considerably lower in smaller, more remote and marginalized communities compared with urban centres or larger local communities with more availability of employment and economic opportunities.

Fourth, a correction of GDP for inflation must be made in order to make estimates comparable over time or between regions. National inflation indices are based on an average consumption basket that is regarded as representative for the entire population. Such an estimate may not reflect well the cost of living for indigenous peoples or residents in small and remote communities. The more skewed the income distribution, or the more heterogeneous in terms of consumption behavior of the population, the more inaccurate and thus less representative this procedure will be. Thus, while a GDP deflator or a consumer price index can be computed for each of the Arctic nations, it may not be a valid reflection of the cost of living for indigenous peoples. While consumption patterns may be quite homogenous in a country such as Iceland, in Russia and Alaska significant differences exist in consumption across local regions and indigenous and non-indigenous communities. This is a general difficulty in the construction of a material well-being indicator and it complicates the task of arriving at valid, unbiased comparisons across regions and time scale.

Fifth, regional comparisons of material well-being based on GDP calculations will be highly sensitive to the year chosen for analysis. Small economic size and a narrow resource base may lead to frequent swings in economic variables as prices or supply of a narrow range of resources change. This volatility complicates circum-Arctic comparisons and raises the risk of arriving at biased or invalid comparisons (Larsen, 2007). The observed economic volatility captured in GDP complicates regional comparisons of material well-being based on single year analysis and GDP data.

Finally, GDP has been criticized for not taking into account the environmental damage and depletion of resources that may result from increased economic activity. More production simply means a higher GDP regardless of what is being produced. But the presence of negative externalities, such as pollution, means GDP is an unreliable indicator of long-term material well-being. As well, the depreciation associated with environmental changes and depletion of resource supplies is missing from the GDP calculation, a crucial limitation in the Arctic where



The town of Monchegorsk, Kola Peninsula, Russia, and the impact on the environment from the large Nickel smelters dominating the town.
Photo: Rasmus Ole Rasmussen

Nome Gold Dredge, Alaska Photo Library of the Alaska Department of Commerce, Community, and Economic Development. *Photo: Alaska Division of Community and Business Development*



natural resources form the basis for the vast majority of formal economic activity. Environmental damage and resource depletion may have a direct impact on traditional activities in the Arctic economy. Both damage to important subsistence resources and conflict over the use of resources may limit the traditional economy while the industrial economy expands.

2.2 Other Standard Indicators of Material Well-being

There are several indicators employed by economists that may prove to be more appropriate for the Arctic context than GDP. Here we examine a number of such indicators with reference to a range of basic selection criteria. Six groups of indicators are briefly considered: income indicators, economic participation indicators, indicators of basic necessities and housing, poverty indicators, subsistence harvest indicators, and indicators of net migration. While some represent an improvement over GDP, these indicators also have certain weaknesses when applied to the Arctic.

2.2.1 Income

Personal income per capita, household income per capita, and disposable income per capita are all measures of the ability of a region's residents to acquire goods and services through the market, and as such they provide an indicator of the market component of material quality of life. Income measures overcome some of the listed drawbacks of GDP. They reference local income of residents, and hence exclude in their calculation the resource rents that flow out of the regions. Income also includes transfer income from higher levels of government that increase the direct income of residents, such as retirement benefits. Additionally, income indicators can be measured at the household and individual level, and for indigenous and non-indigenous residents alike. Most regions regularly gather data on personal and household income through official surveys and censuses, and this helps facilitate comparisons between regions and over time.

However, while income indicators have certain strengths in terms of robustness and their validity for cross regional comparisons, they still have important weaknesses. For example,

while personal and household income are good measures of the command over market goods and services, they, like GDP, do not take into account material well-being generated from participation in the informal economy. Therefore these indicators underestimate the material well-being for regions where subsistence is significant, in particular those regions with a significant share of indigenous households. On balance, however, income indicators do a better job than GDP at measuring material well-being in the Arctic.

A research challenge in using per capita household income as a measure of material well-being is to make this measure comparable over time and place. For economists this involves adjusting for differences in the price level or estimating real per capita household income. An essential part of the process of estimating real income is the development of price indexes that compare the cost of buying goods in two time periods or two different places. These are available in many countries but mostly on a regional scale. This is an important research problem since changes in the prices of goods and services will affect the material well-being produced by any given level of income.

2.2.2 Economic Participation

The opportunity for work provides income and, therefore, command over market goods and services. We can, therefore, consider indicators such as rates of employment, unemployment, and labor force participation as indirect measures of regional residents' command over goods and services. While economic participation indicators are broadly accepted, they do have a number of limitations when applied to the Arctic context.

As a representative indicator of economic participation we can take a closer look at unemployment. Unemployment is one of the main reasons for poverty in rich and medium-income countries and among persons with high education in low-income countries. The effect on material well-being of unemployment will depend on a number of factors, including access to unemployment insurance, social assistance, and other insurance and income assistance programs. Unemployment reduces income generation and hence the command over goods and

services and material well-being in turn. It is not uncommon, however, to find people working full-time but remaining poor (the "working poor") due to the particular social conditions and type of industrial relations prevalent in their country or region, industry, or occupation. Reduced unemployment by itself will not guarantee a high level of material well-being.

Compared with income indicators, economic participation indicators may be less appropriate, particularly for local and indigenous communities. For households significantly involved in the traditional economy, limited participation in the market economy may mean greater production of traditional goods, which contributes to greater material well-being.

Another drawback relates to the statistical challenge presented by the number of "discouraged workers." Northern regions may go through periods of high economic instability, experience boom and bust cycles in industry, structural and seasonal unemployment, and the use of imported labor. In regions with long and widespread unemployment some people give up looking for work, and they become discouraged workers. These people are not reflected in the official unemployment statistics, which means true unemployment in some northern communities may be significantly underestimated. Additionally, due to limited economic and employment opportunities, the problem of underemployment in the North and in local communities can be significant. In some regions of the Arctic the unemployed are well supported via government transfers and social assistance, while in other regions this is not the case.

On balance, the unemployment indicator has weaknesses that make it less appropriate for the Arctic region as an indicator of residents' command over goods and services. The problems of accurately calculating true unemployment numbers, along with accounting for structural or seasonal fluctuations because of the nature of industry, resource dependency, and degree of external ownership and control, complicates some of the key criteria for indicator construction and selection such as robustness and comparability over time and across regions. For these reasons, economic participation indicators can be problematic in local and indigenous communities in particular.



Summer storing of skidoos at the children's playground and surrounded by different types of housing in Tuktoyaktuk, NWT, Canada. Photo: Rasmus Ole Rasmussen

2.2.3 Basic Necessities and Housing

Material well-being can be measured by examining whether residents of a region consume basic necessities of life, which include affordable housing with adequate space; sufficient food, personal goods, and services; and a satisfactory physical environment. Indicators of basic necessities say something about whether consumption or access to a basic necessity is sufficient – with “sufficient” being some predetermined level. Such a measure would compare whether a minimum standard of material well-being is being met across regions and communities or across time. However, what constitutes “sufficient” may vary between regions, local communities, and cultures, and between indigenous and non-indigenous households. Furthermore, what is “sufficient” may be determined in part by the availability of other financial supports, community services, and infrastructure, all of which vary considerably across and within regions.

These measures – arrived at based on some regional standard or measured relative to some minimum standard – are indicators of whether residents of a region maintain a satisfactory minimum of goods and services. They do not measure the actual level of material well-being and therefore fall short of capturing the degree of command over goods and services. This approach therefore complicates the task of mak-

ing valid comparisons and performing monitoring across scales and time. These indicators may also fail the selection criteria for affordability and ease of measurement with the risk of a large margin of error in measurement. As well, they would not necessarily be robust through time, as the concept of what constitutes “sufficient” may change with the multitude of other changes occurring in the Arctic.

One way to reduce the complexity of the basic needs approach would be to focus on a limited number of goods. For example, housing may be an appropriate single good indicator of basic need. Shelter is an important part of material well-being and housing expenditure is usually the largest share of a household's budget. The impact of housing on the overall material standard of living will be large. Housing affordability, which measures the proportion of the population spending more than a certain proportion of their income on housing, is one way to measure the impact of housing on well-being. An alternative indicator may be “household crowding,” measured by the number of rooms or square feet of housing per person. To truly examine the effect of housing on well-being, both measures would be useful, since together they tell us both the quality of housing being purchased and how housing affects the household's ability to buy other goods and services.

2.2.4 Poverty

Measures of absolute poverty, relative poverty, the proportion of a population with low incomes, and income inequality provide another way of looking at that portion of material well-being that is satisfied in the market economy. These measures help describe the segment of the population that do not have the resources to adequately provide access to market goods and services.

The concept of poverty refers to a long-lasting situation of inadequate access to sufficient goods and services. In contrast, and as noted earlier, the number of unemployed can change very fast, especially in smaller and more remote northern communities where local labor markets may be characterized by one or just a few employers, as for example in the case of a northern mining town. Closures of northern mines or sudden changes in value or volume of natural



A combination of old houses (along the beach), concrete apartment houses from the 1960s and 1970s (behind the old houses), behind them newer apartment houses from the 1980s and 1990s, and new constructions in the middle. Nuuk, West Greenland, 15105 inhabitants (2009).

Photo: Rasmus Ole Rasmussen.

resources, seasonal variability in availability of work, and other short-term circumstances in the North influence the level of unemployment. Since they measure longer term conditions, poverty indicators may have certain strengths that are not present in indicators of economic participation.

Poverty can be measured using a “poverty line,” a measure of the level of income needed to be able to subsist in a society. Poverty lines are not uniform, of course, but vary from one place to the next and from time to time along with changes in cost of living and people’s expectations. The choice of a poverty line is largely arbitrary, and in order to arrive at a poverty line accepted by society it must conform to some accepted norm of what constitutes a minimum standard of living.

Poverty can be measured in absolute or relative terms. Absolute poverty refers to a situation where people are unable to command sufficient resources to satisfy basic needs. An absolute poverty line is one that is fixed in terms of the living standard indicator being used, usually consumption or nutrition. The number of people living in absolute poverty is calculated as those living below the specified minimum level of real income. The poverty line may vary, but only so as to measure the differences in the cost of a given level of welfare. The most common approach to establishing a poverty line is

to estimate the cost, in each region or at each date, of a certain bundle of goods necessary to attain basic consumption needs.

A possible drawback to using absolute poverty as an Arctic social indicator of material well-being is the complication of defining a poverty line that is valid for both indigenous and non-indigenous residents as well as regional and local communities across different economic structures. The process of agreeing upon a single measure of absolute income poverty across the circumpolar region significantly complicates the task of determining what is “necessary” and what is “minimum.”

While absolute poverty refers to the set of resources a person must acquire in order to maintain a minimum standard of living, relative poverty is concerned with how well off an individual is compared with others in the same society. An absolute poverty line is a measure that could, adjusting for price fluctuations, remain stable over time, whereas a relative poverty line is one that could be expected to shift with the overall standard of living in a given society. But there is a possible pitfall in using relative poverty as an indicator, just as there is with absolute poverty. When the relative poverty line is fixed as a proportion of the national mean, and if all incomes increase by the same proportion, there would be no change in relative inequalities, and the poverty line would

simply increase by the same proportion; that is, the poverty measure will not change although material well-being may have changed. This scenario can make such poverty lines deceptive for some purposes, such as assessing whether poor people are better or worse off as economies undergo development. In such a case, this indicator is less powerful in monitoring and tracking human development across regions and over time.

A measure of the proportion of a population with low incomes is a possible alternative to absolute and relative poverty measures. This indicator provides information about how equitably resources are distributed and how many people are likely to have an income that does not allow them to participate fully in society or have adequate command over goods and services. Income inequality is also measured by comparing the incomes of the top 20% of households with the incomes of the bottom 20%, for example. High levels of inequality are associated with lower levels of social cohesion and personal well-being, and this indicator provides important information to help support the analysis of the level of material well-being.

In conjunction with a per capita income indicator, data on income inequality provide important information about the level of material well-being. While this type of indicator would not by itself provide sufficient information about material well-being, it does provide useful information that GDP overlooks. It is not straightforward to measure, however, and data collection for a measure of income inequality may be costly in terms of time and other resources and thus fail based on indicator selection criteria.

For comparisons over time, the poverty line must be stable and consistent. A critical drawback is that poverty indicators, as in the case of other indicators discussed here, do not account for the contribution made to material well-being by subsistence and traditional activities in the North. Low incomes may be a matter of choice if households are making a trade-off between time spent working and time spent hunting or fishing. A household may be made better off if it sacrifices money income for subsistence production. In general, poverty rates on their own without some measure of sub-

sistence activity may easily underestimate the actual level of material well-being in the Arctic.

2.2.5 Subsistence Harvest

As discussed in the previous sections, the subsistence sector figures prominently in the Arctic economy. For this reason the inclusion of measures of production in this sector are necessary to arrive at a more complete picture of material well-being. Ignoring subsistence would be a particularly serious flaw in measurement when analyzing local and indigenous communities. The contribution made by subsistence can in principle be gauged by looking at either subsistence outcome or input, where harvest per person provides a measure of outcome while degree of involvement in subsistence activities provides a measure of input.

Recognizing the role of traditional activities in the North means that an indicator of material well-being must also recognize that in some parts of the Arctic subsistence activities are more important than in other parts (e.g., Chukotka versus Iceland). We could ignore the traditional economy in a measure of material well-being only if it was similar everywhere and was not likely to change. But the size of the informal economy relative to the formal economy may change considerably over time, fuelled by climate change, globalization, and other socio-economic forces. Ignoring subsistence is more significant for the indigenous part of the population than the non-indigenous population.

It would be a relatively costly undertaking to construct an indicator of subsistence harvest, however. The range of types of subsistence food vary considerably throughout the Arctic and, thus, obtaining a measure of this indicator that enables comparison across space and time, perhaps based on the weight of subsistence, would not be straightforward. Data do not exist or are not readily available from official statistics in many places. Subsistence data may have to be developed through surveys, although the SLiCA survey does provide some data on indigenous households for the regions of Canada, Chukotka, Alaska, and Greenland. These data are available for the survey year only.

2.2.6 Net Migration

Migration is a significant demographic force in the North. Across the Arctic nations, the North is primarily a sending region; that is, more people leave northern regions than move there. Migration affects the number of people living in a region. It also influences the demographic structure of a place, since the propensity to migrate differs across demographic groups (Hamilton and Seyfrit, 1994). The pattern of migration can provide indirect information about the relative well-being that a place provides.

Generally, people move so that they are better off (Sjaastad, 1962). Sometimes a move is for a short period of time to secure training or education; this human capital investment allows the migrant to return home to improved job prospects. Most long-term moves are likely because the move provides a higher level of well-being through improved job opportunities and/or higher wages. Well-being might also be improved if the move offers an increase in quality of life, better schools, less crime, or better weather (Roback, 1982). As well, the relative productivity of traditional activity in different places will affect the pattern of migration.

Net migration is the difference between the number of people moving into a place and the number moving out. The net migration rate of a particular place is calculated by dividing net migration by the population of the place at the beginning of the period. Comparing the rate of net migration between different places allows a rough estimate of relative well-being. Migration also has a time dimension however; movement needs to be measured over some period of years. Places with relatively higher rates of net migration can be thought to offer greater opportunities to improve well-being.

There are three limitations to the use of net migration rates as a measure of relative well-being. First, migration will be influenced by more than relative opportunities; past migration will affect the pattern of migration. For example, places with historic high out migration may have relatively higher return migration. Migration will also be affected by the costs of moving, which include both monetary and social costs. For example, it may be difficult for

a person to move out of a poor region if he or she does not have the resources to finance the move. In such a case, out migration from places with little economic opportunity may be limited. These factors may limit the direct relation between migration and place well-being.

The second limitation is the quality of the data. A common problem with measures of relative well-being starts with the collection of data, which varies from country to country (Lucas, 1997; Lall et al., 2006). Migration information may be available only for broad regions limiting the geographic scale, which can be assessed. Regional data can mask important intraregional movement; not all communities in a region are alike. Migration information may also be collected at different points in time, and time is important if we want to distinguish permanent moves from shorter term commuting.

The final limitation to using net migration as a measure of relative well-being is the difference in migration propensity across demographic groups. For example, younger people and more educated people are more likely to move to take advantage of greater opportunities. In other words, because of the difference in propensity, a high net migration may simply reflect a younger demography, rather than what we would like it to reflect (that higher net migration reflects higher material well-being). If everything else is the same, there are likely to be higher rates of out-migration in places with a relatively younger population.

Despite these limitations, net migration offers one possible method of assessing well-being across the Arctic. It does not have to be measured directly; it can be estimated whenever there are good records of births, deaths, and total population, and most countries keep adequate records of these statistics. Any changes in population after the effects of natural increase (i.e., births and deaths) have been accounted for are a result of net migration. By using net migration rates, we can standardize comparisons of regions of different sizes. Standardizing the time periods examined will also be an important step in using net migration as a measure of well-being. Given these caveats, places with relatively higher rates of net migration can be thought to offer greater opportunities to improve well-being.

3.0 Selected indicators of Material Well-being for the Arctic

All traditional indicators of material well-being suffer when facing the demands for use in the Arctic. Consequently, we suggest a series of indicators that can be compared across time and place. The goal of this comparison is to determine if simpler and easier measures, such as per capita household income, provide a useful picture of the Arctic across time and region. A good and more holistic set of material well-being indicators would include attention to the

Village of Akiachak; Anchorage, Alaska Photo Library of the Alaska Department of Commerce, Community, and Economic Development. Photo: Alaska Division of Community and Business Development.



three sectors of the Arctic economy: formal, informal, and transfer. We propose three indicators of material well-being that we argue hold particular promise for the Arctic, plus a composite indicator that accounts for all three sectors. Each of the three indicators (per capita household income, net migration, and subsist-

ence harvest per person) would leave us with an incomplete picture of material well-being in the North. The composite indicator provides an alternative solution to the dilemma of pinpointing only one indicator of material well-being.

3.1 Per Capita Household Income

An indicator of per capital household income performs well based on a range of selection criteria, including affordability in terms of time and resources and data availability. However, one important limitation with this income indicator is that it ignores both direct services purchased with public transfers and production in the traditional economy. As we have discussed, any measure that ignores these factors leaves us with an indicator of minimum material well-being. On the other hand, one particular strength of this indicator is that it provides a more accurate estimate of income in the North than does the standard measure of GDP. (Note that per capita household income is a tier 1 indicator; an indicator that can be measured using existing data – see Table 3.1).

3.2 Net Migration

Although the net migration indicator has several weaknesses, it scores high on selection criteria and would be reasonably easy to measure – an important criterion to meet. It is robust and makes for easy comparison across scales,

Table 3.1: Matrix for Material Well-being

Indicator	Data Availability	Data Cost	Ease of measurement	Internal Validity	Robustness	Scalability	Inclusiveness
Per Capita Gross Domestic Product	Tier 2	Medium	High	Low	High	Region	No
Per Capita Household Income	Tier 1	Low	High	High	High	Household through Region	No
Unemployment Rate	Tier 1	Low	High	Low	Medium	Household through Region	No
Poverty Rate	Tier 1	Low	High	Low	Medium	Household through Region	No
Subsistence Harvest (weight)	Tier 3	High	High	High	High	Household through Region	No
Net-migration Rate	Tier 1 or 2	Low	High	Medium	Medium	Community and Region	Yes

Notes: Tier 1: based on existing published data
Tier 2: data that would be produced by special tabulations from existing unpublished data
Tier 3: would require primary data collection



Producing tents for summer camps in Fort McPherson, NWT, Canada.
Photo: Rasmus Ole Rasmussen

time, and regions. As long as we assume the cost of moving is similar for all people, it is applicable to both indigenous and non-indigenous inhabitants. While this is a broad assumption to make, this indicator still has attraction. On balance it fares better than several more standard measures of material well-being and can therefore be considered as a possible alternative indicator. (This is a tier 1 or tier 2 indicator – see Table 3.1.)

3.3 Subsistence Harvest per Person

The value of subsistence harvest consumed is an indicator that we recognize as critical to the economy of the Arctic. At the same time, we argue it cannot stand alone as an indicator of material well-being, and that serious data and measuring issues need to be addressed before such an indicator can be relied on for an acceptable proxy. (This is a tier 3 indicator, one that would require primary data collection, and hence cannot be measured until primary data becomes available – see Table 3.1.)

3.4 A Composite Index

The Arctic economy affects well-being through the formal sector, the informal sector, and the transfer sector. Personal or household income addresses many of the special considerations of the Arctic economy. It includes only income

received by residents of the region. Returns to capital, payments to higher levels of government, and earnings of workers from outside the region are not included in household or personal income. Personal or household income has the benefit of including that portion of the transfer economy that goes directly to individuals through wages on government jobs or income support payments.

A composite indicator could add a measure of subsistence or traditional harvest to incorporate the real income earned in that sector. A household's material well-being in the North is affected both by what it earns and what it harvests for consumption or sharing. There is currently no good universal measure of harvest that is regularly available. If one could be developed through survey or some other means, it could be added to the household or personal money income for an estimate of real income. The primary theoretical challenge for constructing such a composite would be how to weigh the two components of the index. One approach would be to put the subsistence harvest in money terms with a "price of subsistence foods." If subsistence harvest were perfect substitutes for store-bought food, an average meat price in the region might be used. In some regions subsistence harvests are sold, which would provide an accurate price for weight-

ing the marginal harvest. The choice of a weight should be based on serious analytical effort.

One element left out of this composite is the indirect effects of the transfer economy on material well-being. In many parts of the Arctic, government provides goods and services at lower than the actual cost. These government goods and services are part of the indirect portion of the transfer economy. Government subsidies for housing or utilities or transportation fit into this part of the transfer sector. Constructing an indicator for this part of the transfer sector, which is relevant across the wide variety of social systems found in the Arctic, will be difficult. Per capita spending by higher levels of government may be one way to capture the indirect effects of the transfer economy. However, this will double count some spending since jobs and income support payments would also be included.

Further research is necessary to determine the best approach to measuring this component of local material well-being. A composite indicator will be needed to fully capture all of the

factors that affect material well-being in the Arctic, and such a composite would require the collection of primary data for subsistence harvest and likely reformulation of government data to measure the indirect component of transfers.

Table 3.1 provides a brief summary of how key indicators fare against selection criteria, and it illustrates the genuine dilemma of suggesting an indicator for material well-being in the Arctic. The most efficient, consistent, and robust measure of material well-being is a direct measure of local income, such as per capita or household income. But such a measure ignores the transfer and traditional economies – significant components of the Arctic economy and that contribute to material well-being. Composite indices, which might reflect the contributions of these sectors, also have problems, including challenges with obtaining data and the choice of appropriate representative components and weights.

Ideally, the indicator of choice should be available on a variety of scales and across the circumpolar region, and should enable cross-

Honningsvåg harbour,
on the island Magerøya in
Finnmark, Norway, 2009.
Photo: Jón Haukur
Ingimundarson



regional comparisons and ongoing monitoring of human development. Unfortunately, the perfect indicator may be too costly to construct. In selecting the appropriate indicator we need to balance the information it provides with the cost of constructing it. As in the case of other indicators of human development in the Arctic, we face important trade-offs in devising the material well-being indicators. Compromises will need to be made to achieve good indicators that are obtainable at a reasonable cost in terms of time and resources, and these may be made at the cost of constructing an ideal yet probably unattainable indicator.

Based on selection criteria, including data availability and affordability in terms of time and resources, we recommend two indicators of material well-being: one that cannot be measured and implemented until primary data collection becomes available (a tier 3 indicator), and one that can be readily applied now using existing data (a tier 1 indicator).

Setting aside for a moment some challenging data issues, a fair and reasonable measure of material well-being in the Arctic must consider all three aspects of the Arctic economy: formal, informal, and transfer. This can be achieved by creating a composite index that accounts for all three sectors as proposed. For those who seek only a single indicator of material well-being, the composite indicator provides an option, albeit as a tier 3 indicator (i.e., one that requires primary data collection, and hence cannot be measured until such data become available). The composite indicator is attractive because it includes three individual indicators, each representing one of the three main sectors of the Arctic economy. On the other hand, it is currently too costly to measure, and the definitions of representative components are yet to be worked out.

Based on affordability and existing data availability, the recommended indicator is per capita household income. In recommending this indicator we have had to accept an important trade-off: while the indicator is already broadly accepted as a standard measure of well-being (which we have argued has certain strengths over GDP), and it is affordable in terms of time and resources and unambiguous and robust over space and time, it comes at the

high cost of excluding the contribution made to material well-being by the subsistence and transfer sectors of the Arctic economy. The primary challenge in the use of per capita household income will be developing a means of adjusting this indicator for price differences between time periods and across regions.

4.0 Concluding Comments

The Arctic economy can be divided into essentially three parts: the formal economy, the informal economy, and the transfer sector. The formal economy is characterized by the dominance of the primary sector in the industrial economy, with significant large-scale natural resource exploitation activities. In some cases the transfer sector is sizeable; some northern local governments are highly dependent on the annual transfers from central governments. Most northern residents also rely on the traditional or subsistence-based sector to provide for some of their material well-being.

GDP is a widely used indicator of material well-being. GDP, however, has a number of weaknesses. The exclusion of the informal economy is a major weakness considering the importance of informal activities in many parts of the Arctic. In constructing indicators on material well-being, we have sought indicators that not only perform well against a set of chosen criteria, but that also address this shortcoming of the tendency to exclude the contribution of the informal economy in measures of material well-being.

If we had to choose one indicator, a composite indicator that includes representative indicators reflecting all three main parts of the Arctic economy holds promise. This indicator, however, has significant challenges: the details of its construction, the difficulties of measuring the contribution made by subsistence and transfers, and the difficulty of obtaining accurate and regular data on subsistence harvest. An indicator of per capita household income overcomes some of the difficulties plaguing the composite indicator, but its failure to include the subsistence and transfer sectors must be recognized. A compromise to consider in future research is to construct a composite indicator

that accounts for only household income and subsistence.

All traditional indicators of material well-being suffer when facing the demands for use in the Arctic. Until more data become available, including new approaches to primary data collection, any attempt to measure and track material well-being in the Arctic is incomplete.

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4 Education

Rasmus Ole Rasmussen, Raymond Barnhardt, and Jan Henry Keskitalo

1.0 Introduction

Education is often emphasized as a key field of concern when unfolding the concept of development in connection with the identification of key social relations of ongoing changes in the Arctic. For many the question of access to education is perceived as a key indicator of human development as it contributes to the accumulation of human capital. Equally important, however, is the content of education, including how well it fulfills different levels of needs – local, regional, national, and global – and thereby contributes to the role that the social capital may have in a specific setting.

1.1 The Concept of Education

Education is not a neutral enterprise. Embedded in the educational process is the promotion of skills, values, history, languages, and ways of thinking and behaving (AHDR, 2004). It is most apparent in its institutional form as schools, described as a formalized process whereby nations perpetuate their values and beliefs from one generation to the next, including science, art, sport, and other facets of culture. In this context, local and regional human capital needs are involved in the broader context of national needs and globalizing factors, where each of the circumpolar states has a vested interest in education.

It is often emphasized how many Arctic residents have a highly sophisticated grasp of matters important to their well-being, but that their knowledge often does not translate into

high scores in terms of adult literacy and gross school enrollments (AHDR, 2004). Further, when looking into goals and methods, it becomes clear that neither state and regional authorities nor Arctic residents share equally the authority for education policies. As a consequence, the present characteristics of the formal educational systems in the North reflect differences in approaches to the status of, and changes in, the societal and cultural goals (Darnell and Hoëm, 1996). A challenge, therefore, is to develop an indicator that is able to transcend these differences and still maintain its validity.

1.2 Education for Whom?

It is generally emphasized how education has a leading role to play in economic and social development. For instance, Oxaal (1997) notes the ways in which development leads to the reduction of poverty, thereby generating the

Enjoying each other's company, a cup of coffee and dried fish in the village Sarfannguit, West Greenland. The settlement had 107 inhabitants (2009).
Photo: Rasmus Ole Rasmussen



social surplus needed for communities to take charge in the development process. Both human capital and correspondence theories imply that an effective anti-poverty strategy should incorporate the enhancement of education and skills among households, as there seems to be significant linkages between poverty and education. At the macro level, enrollment correlates with the Gross National Product; at the micro level, poor children, particularly girls, are traditionally less likely to enroll. Poverty is both a barrier to education and an outcome of the lack of education. Further, poverty alleviation and gender equality strategies focusing on investment in education greatly depend on government action, first and foremost in relation to financing (Checchi, 2003).

Psacharopoulos (1988) stresses that the link between education and development is complex, arguing the need to distinguish between “external efficiency of education” (direct link between school participation and occupational attainment) and “internal efficiency of education” (linkages between family background, schooling, and learning outcomes). There is clearly a variety of effects of education in improving individual productivity, not only in the marketplace, but also in the household. In simple economic terms there seems to be a trade-off between low immediate earnings and higher future earnings following additional education.

Government spending on upper secondary and higher levels of education very often favors well-off populations, while public spending on primary and lower levels of education largely benefits the poor (Demery, 1996). Rural areas, and especially minority areas, are generally exposed to lower input in relation to education, which may lead to policy that is biased toward urban life as background for education. Compared with the level of social expenditure in cities, rural areas generally receive far less attention and allocation of resources.

The experience in northern Canada, where there are concerns for minority development, particularly in relation to the fields of social justice and economic equity, highlights this point. Over the years Canadian minority groups have faced a number of problems related to the modernization/urbanization process, including

an increased risk of assimilation in urban areas and the loss of community vitality (Cao and Dehoorne, 2002; Cao, Chouinard, Dehoorne, 2005). In response, Canada has been implementing a political, legal, and social system in which minority interests and socioeconomic needs, such as those of francophone, Acadian, and Aboriginal populations, have been represented. This has met with some success, although there is some debate about whether the efforts have been sufficient.

Better socioeconomic and political accommodation for minority groups, nevertheless, has contributed to the overall well-being of society and the sustainability of economic growth. Parallels to the Canadian model are found in other parts of the Arctic (Seyfrit et al., 1997; Friedel, 1999; *Language and Culture*, 1985), but do not necessarily encompass the generation and gender differences in preferences and perspectives in relation to development (Warren et al., 1995; Rasmussen, 2008). In this context, it has been shown how countries – but also communities – have different approaches to formalized educational systems of states and territories/provinces, demonstrating a range of positive experiences (AHDR, 2004).

It seems that some Arctic countries follow the international trend of increased central control, whereas others increasingly recognize the need for more local control. A proper indicator, therefore, should reflect the tension between local and central control across the Arctic and how it has affected the direction and quality of northern education. As well, it should be emphasized that there are marked differences in perceptions of what is considered “the good life” and “development perspectives” among youth in the late 20th century compared with youth in the beginning of the 21st century (Rasmussen, 2008).

1.3 Education—for What and How?

Human capital theory states that education provides the necessary skills for a higher level of productivity among people in both the marketplace and the household (Brock and Cammish, 1991). In support of human capital theory, it has been documented that primary education in particular increases productivity while simultaneously improving people’s earnings. Whether

education enhances personal abilities or simply identifies talent – as suggested by the “screening” theory – it has been shown that not only is each additional year of education associated with higher earnings and better opportunities, but also that educated women are able to manage their lives better (e.g., fertility control) and thus have some measure of control over the family’s financial situation (Oxaal, 1997).

Control of one’s own destiny, cultural continuity, and contact with nature are elements for which one indicator could be the level of indigenous languages spoken in schools. And, as emphasized by the AHDR, the content of the education is a significant tool for maintaining and renewing the formal skills that are needed in order to be in control. But more is needed, as the outcome of the learning process is influenced by the conditions under which learning takes place. School instruction using cultural practices in combination with activities outside the formal school setting, therefore, needs to be included as well and should be pinpointed when we characterize the educational system. Otherwise the development process may be a continuation of the process of “difference blindness” where ignoring the importance of the whole context of the learning environment leads to the loss of many rare languages and important elements of indigenous cultures. This understanding fully complies with the general

recognition that learning is influenced by the environment in which the learning is taking place, and that knowledge, like other resources, is localized.

The mental process of learning is not separable from the physical process of doing, and as the physical process is situated, so also is learning (Dewey, 1938). This characteristic of knowledge becomes very clear when different knowledge systems are confronted because different conditions for acquiring knowledge create different ways of both perceiving and knowing. The situated characteristic of learning influences how different knowledge systems interact and, to the extent possible, how the local agenda is connected to the global agenda, and vice versa. The term “situated knowledge” emphasizes that the acquisition of knowledge is influenced or determined by the specific conditions characterizing the acquisition process. It also stresses that the conditions of knowledge acquisition and the level of generalization should be considered, whether these are linked to ethnicity, culture, vocation, gender, or other specific conditions (Lave, 1988; Lave and Wenger, 1995), as well as through the foundations of knowledge in everyday life (Berger and Luckmann, 1966).

In line with this thinking, AHDR (2004) emphasizes how researchers have demonstrated that student motivation and success increase

Pavva Inupiaq
Dancers, Fairbanks, USA.
Photo: Franklin Adam
Francis-Chythlook





Children playing in the school yard during a break. Tasiilaq, East Greenland, a town with 1893 inhabitants (2009).
Photo: Rasmus Ole Rasmussen

when teachers make school subjects relevant. A significant issue is the balance between local and centralized curricula control. The degree of autonomy given to each school and the resources that go along with it vary a great deal. There is no clear circumpolar trend on how different countries strike the balance between standardized curriculum and locally specific content. Education is at times seen as an arena in which different social groups struggle for influence, often in subtle ways. Instead education should be an important indicator for human development in the circumpolar region.

A key issue is empowerment. On one hand, empowerment of individuals enables a proportion of students to continue past primary school to secondary school graduation and, in some cases, beyond to technical colleges and post-secondary institutions. On the other hand, empowerment of the communities enables them to react to ongoing changes in a manner where education serves both the external and internal requirements. As emphasized in the Arctic Human Development Report, the most critical concerns are for control, relevance, and access

to education. These three concerns are directly impacted by the acknowledgment of distributed knowledge and the need to adapt education services to fit local needs and conditions. "This requires a shift from viewing knowledge as a standardized commodity to seeing it as a distributed resource with decentralization of control and decision making, local adaptations of curriculum, and increased use of technology to access knowledge from any place at any time (i.e., University of the Arctic)" (AHDR, 2004).

It is important, however, to emphasize that empowerment is a multi-dimensional concept leading to divergent consequences. An individual may be empowered to fulfill an important function in the community, thereby enabling him or her to stay. But that person may just as well be empowered to leave the community, looking for adequate challenges and opportunities elsewhere. Education can bring "the outside into the community," but if the social system is not able to accommodate this, it may as well lead to "bringing the educated to the outside."

Similarly, empowering the community may

be biased. The present focus on post-colonial measures may on one hand strengthen communities, enabling them in the short term to resist the pressure from the outside. These measures, however, tend to be less responsive to the marked differences in both gender and generational factors in relation to development, which is clearly indicated in contemporary analysis of ongoing demographic changes (Rasmussen, 2008; Rauhut et al., 2008). Consequently, it is important to be aware of these changes in order to enable the indicator to be responsive to future development trends.

1.4 Framing the Situation

An indicator – or a set of indicators – should be able to fulfill two goals. First, it should be able to be generated effectively, and second, it should reflect the purpose of its use. Some general considerations of the concept of reflection have been outlined above, but note also that an indicator should relate to the present status of the communities and their social and educational status.

Possible indicators for education are discussed in the next section, which is accompanied by a number of relevant maps (see Figures 4.1 to 4.8).

2.0 Possible Indicators of Education

To identify possible education indicators some of the key demographic characteristics of Arctic communities must be outlined so that we can consider the dynamics that will affect the basis of education in the future. Three issues to reflect on are changes occurring in age structure, the ratio of females to males, and the indigenous and non-indigenous population characteristics.

2.1 Age Structure

The proportion of the population in the 0 to 15 year age group (see Figure 4.1) is an important consideration for future demands on both education opportunities and on the provision of skills and knowledge needed for future development in the North. The demands will be not only on offering high-quality skills training,

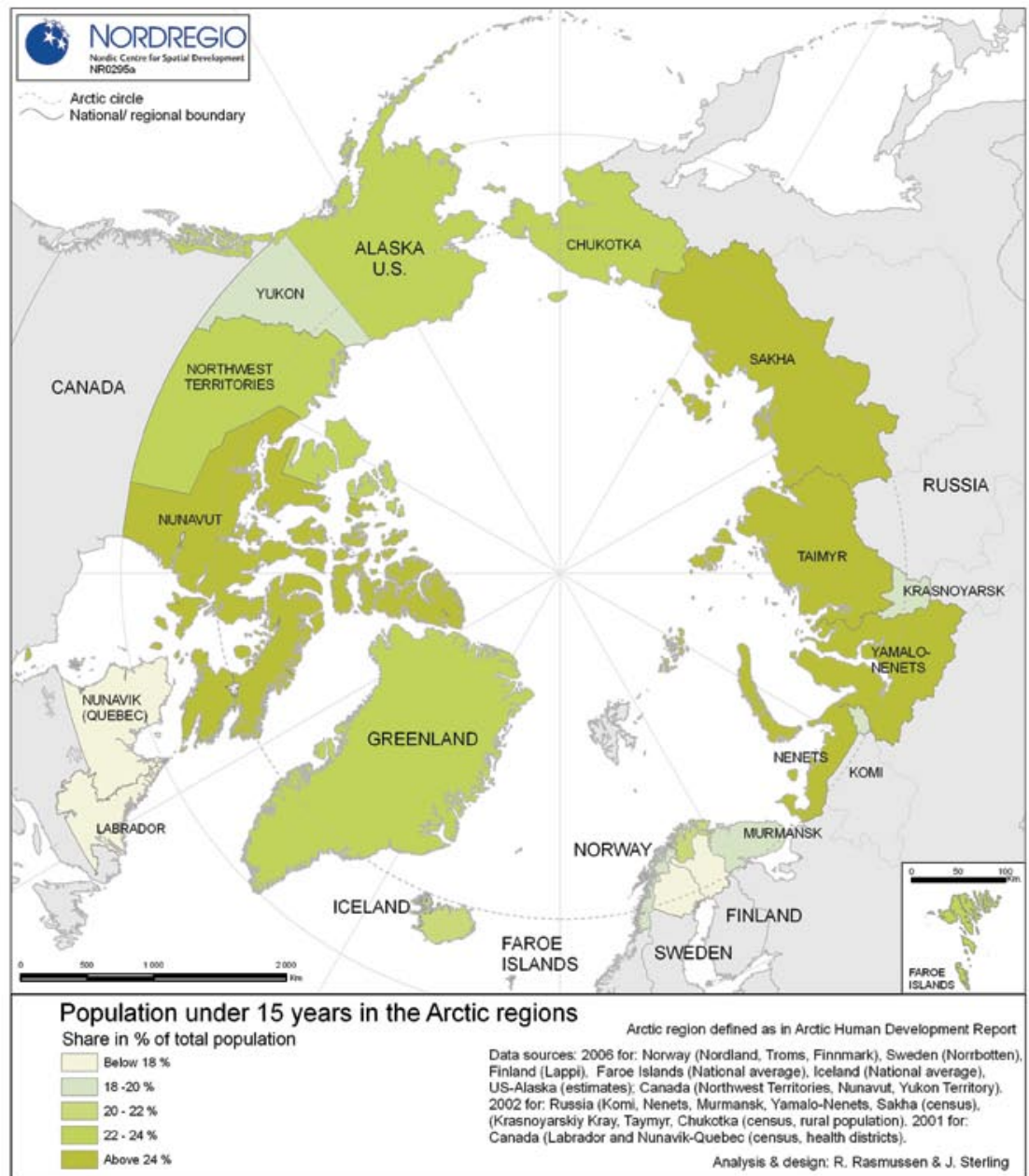


but also on quantity of education and training required.

Until recently, the Arctic has generally been characterized by a high reproduction rate accompanied by a relatively high death rate, reflected in a pyramid-shaped population distribution with a large base (i.e., higher proportion of children and young persons). This pattern, however, has been undergoing marked changes during the last decades and especially the last 10 years. A considerably higher life expectancy and a marked reduction in the reproduction rate accompanied by a relatively high outmigra-

Indigenous Studies PhD planning workshop held in October 2007, Fairbanks, Alaska.
Photo: Sean Topkok

Fig 4.1



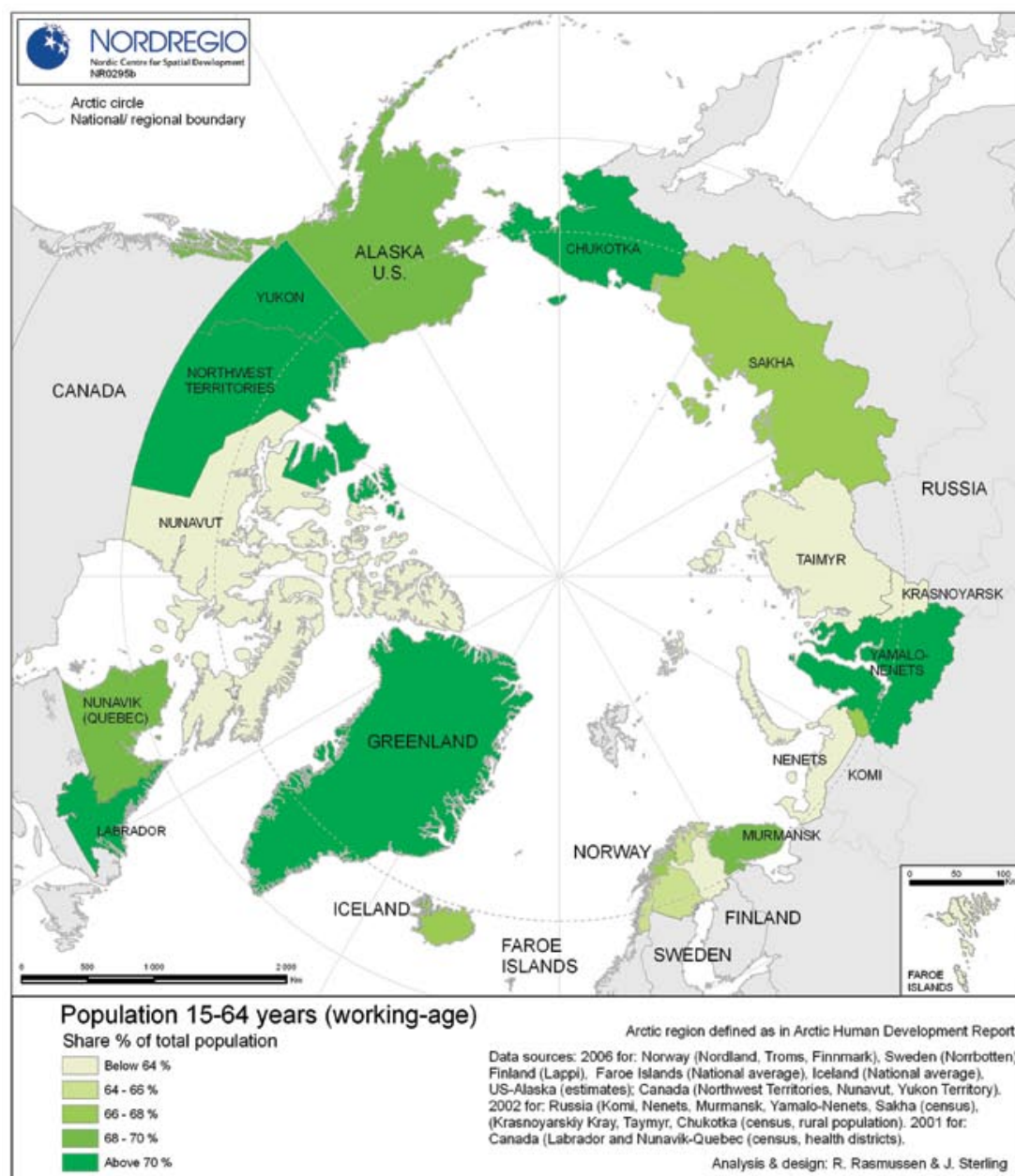
tion rate has become visible in the age group distribution, opening up the possibility of a future shortage in the labor force, especially among skilled workers. An important consequence to this change has been a relative reduction in number of persons in the active working age group of 15 to 65 (see Figure 4.2) and a marked increase in the dependency ratio (i.e., the relationship between number of dependent persons – pensioners and children – and number of persons in the active working age range).

2.2 Ratio of Females to Males

Comparative research from a number of north-

ern regions (Alaska, Greenland, the Faroe Islands, Newfoundland, and Iceland) indicates very similar patterns regarding affinity to rural community life. Compared with males, more females migrate permanently away from their home community and region, first to look for job opportunities that better fit their qualifications, and also to provide opportunities outside traditional economic activities in these communities (Hamilton, 2003; Hamilton and Butler, 2001; Hamilton, Haedrich, and Duncan, 2004; Hamilton and Otterstad, 1998; Hamilton and Seyfrit, 1994; Rasmussen, 2005). A consequence of this trend is a distorted female-to-male ratio; that is, compared with national averages, there

Fig 4.2



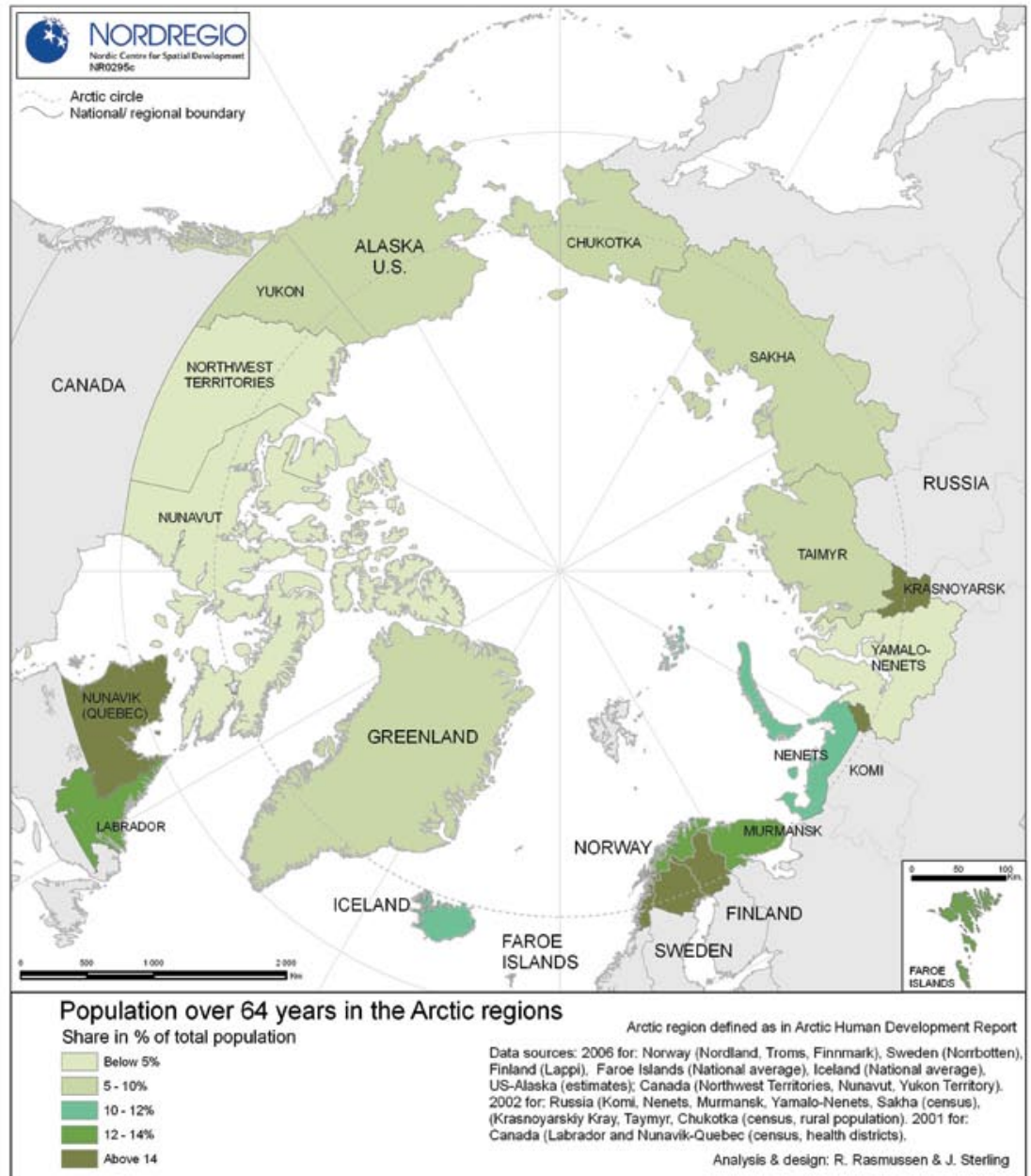
are substantially fewer females than males (see Figure 4.3). In some regions, the ratio is as low as 70 females to 100 males.

This change reflects a general pattern that has emerged in the context of the decline of the primary sector as an economic base and the growth of the service sector and increased emphasis on technology – a pattern that fundamentally affects women. Under these conditions, women tend to experience negative short-term and long-term consequences in terms of careers, earnings, and pensions, all of which have severe consequences for migration patterns. Consequently, there has been a continuing outmigration of young and well-trained per-

sons from regions that are predominantly dependent on primary sector activities.

The decreasing number of women in rural Arctic communities negatively affects both the social life and the economy of these regions. There are fewer opportunities for marriage, it is more difficult to maintain family life and family structures, and cultural activities are influenced (Hamilton and Seyfrit, 1993; Rasmussen, 2005). Furthermore, this situation contributes to the deterioration of the institutions of social infrastructure and to the decline of services of public interest, eventually leading to a loss of population and observable lower fertility rates, thus endangering the medium- to long-term deve-

Fig 4.3

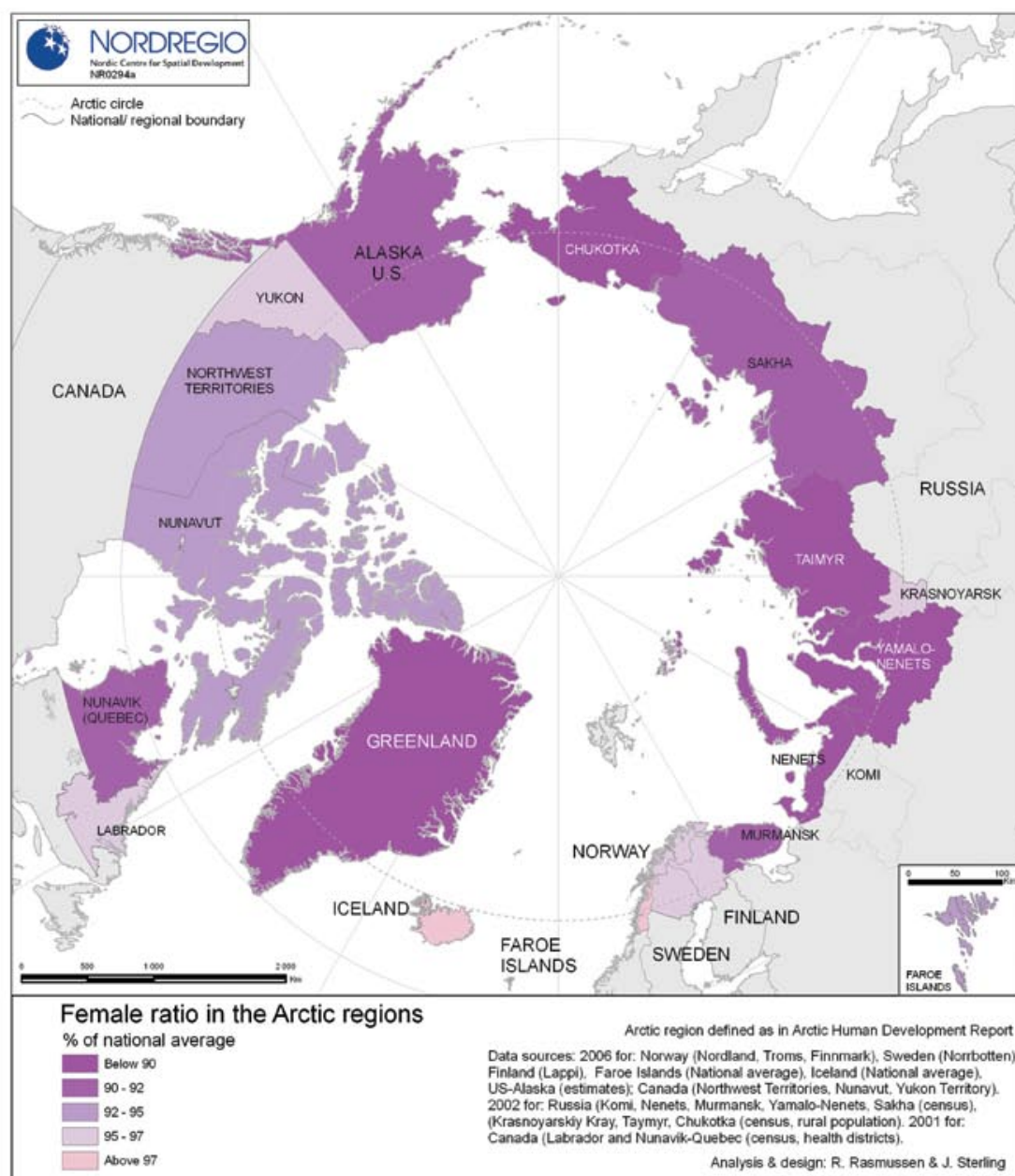


lopment of these regions. It has been argued that the relatively high number of women employed in the service sector represent “an escape valve” away from the traditional rural structure based on primary sector activities, which has become highly mechanized and masculine, toward a new, more diversified socioeconomic structure in which women participate in and receive both a salary and social protection (Garcia and Gonzalez, 2004).

These patterns can be seen as being connected to a number of gender-related differences in aspirations and approaches to change. The first of these is the question of work and work-related activities and how the perception of

customary male activities related to renewable resource exploitation seems to be “sticky.” It appears that males generally have difficulty in moving on from what once were key activities, but what now constitute only a minuscule percentage of the available jobs. In contrast, females in their upbringing have been socialized into collective activities and are more attentive to the needs of others; consequently, they are much more open to change (Rasmussen, 2007; Hansen, 1992; Petersen, 2002; Nathansen, 2004). As a result, females are less limited by specific job characteristics, determined by what may be considered as being “traditional” and “acceptable” activities. In other words,

Fig 4.4



males seem to be socialized into a path of dependency, creating difficulties in accepting changes, while females tend to be socialized into situations where adjustment and change are required, leaving them prepared to move between job categories and job options. Only those jobs that are related to new technology offer an alternative that provides status for males. Consequently, the adaptation to change through the educational system fits much better with the socialization of women, despite women being constantly underrated and underrepresented in high-ranking positions in both academia and administrative affairs.

2.3 Indigenous and Non-indigenous Persons in Post-secondary and Tertiary Education

The gender differences discussed above in relation to using the education system as a means of adaptation to change is seen among both indigenous and non-indigenous inhabitants. But between the two groups there are marked differences in enrollment in educational activities. There are many and various causes to both positive and negative outcomes of establishing, recruiting for, and fulfilling higher education programs. Cause and effect varies within different contexts in the Arctic. These differences can be explained by entrance variation, by degrees of individual academic and social integration,

and by the interplay between the institution and the surrounding community (Barnhardt and Kawagley, 2004; Hoëm, 1978, 2007; Darnell and Hoëm, 1996; Høgmo, 1989; Keskitalo, 1998).

It is important to emphasize that an increasing drop-out rate is a common problem outside the Arctic as well. Within the OECD member states, on average one-third of students do not complete tertiary type-A programs (OECD, 2006). Within the Arctic, somewhat higher numbers complete, but the issue of dropping out must still be considered a challenge.

There are many examples. As early as the mid-1960s, educational research in Saami areas in Norway showed evidence that primary education was dysfunctional for the Saami (Hoëm, 1965). Further, it has been emphasized that Native American students are more likely to drop out of college for non-academic reasons than for academic deficiencies (Tierney, 1992; Reyhner and Dodd, 1995). Similarly, Statistics Iceland has examined the drop-out rate of students in tertiary education by comparing the Statistics Iceland Student Register with the Register of Examinations. The results show that from autumn 2002 to autumn 2003 a total of 2,037 students dropped out of school or took a temporary leave from their studies, resulting in a drop-out rate of 14.7%. The rate was lower

among students in day courses and distance learning and higher among students in evening courses. In addition, the drop-out rate was lower among students in full-time study and higher among students in part-time study. Similarly, drop-out was greater among men than women and generally increased with the increasing age of the students (Hagtiðindi Skólamál, 2004).

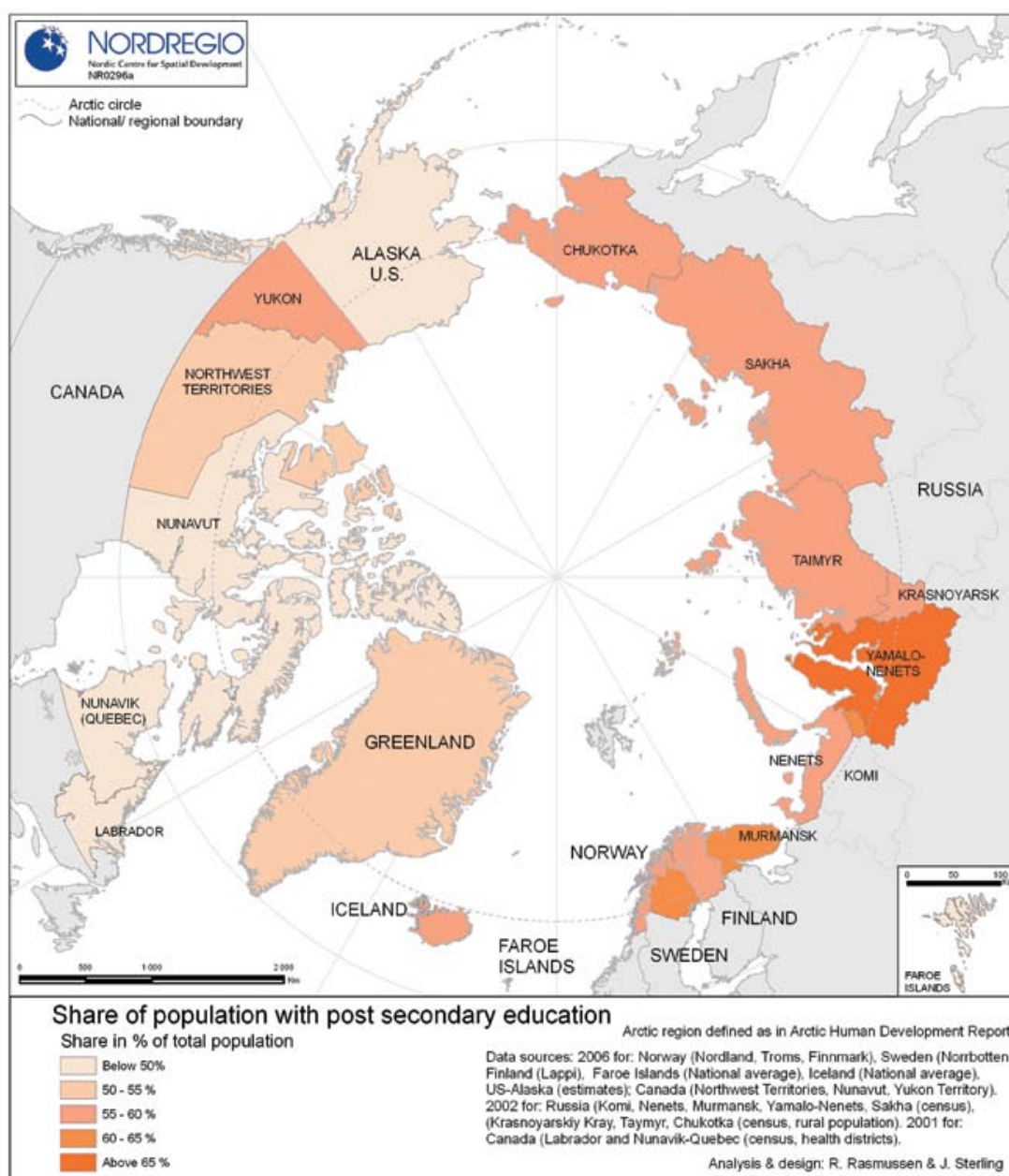
New statistics from Canada show a dramatic increase – 45% in 10 years – in those people who identify themselves as belonging to an indigenous group. The information also reveals that 54% of the country's indigenous people now live in or near cities. Officials at Statistics Canada, which carried out the census, say the growth and change in demographics can be attributed to a soaring birth rate driven by an unusually young population and greater pride in Aboriginal heritage (Statistics Canada, 2006).

An increasingly important factor is the variation between urban and rural communities, ranging from large cities to small villages. And the most challenging of the variations is the dimension of cultural and linguistic diversity, just as the degree of socioeconomic adaptation is diverse. Consequently, any formal education system aimed at equity and success for everyone needs to reflect and respect the totality of the interests and values reflected in the background of the students.

Sámi University College.
Photo: Johan Mathis Gaup



Fig 4.5



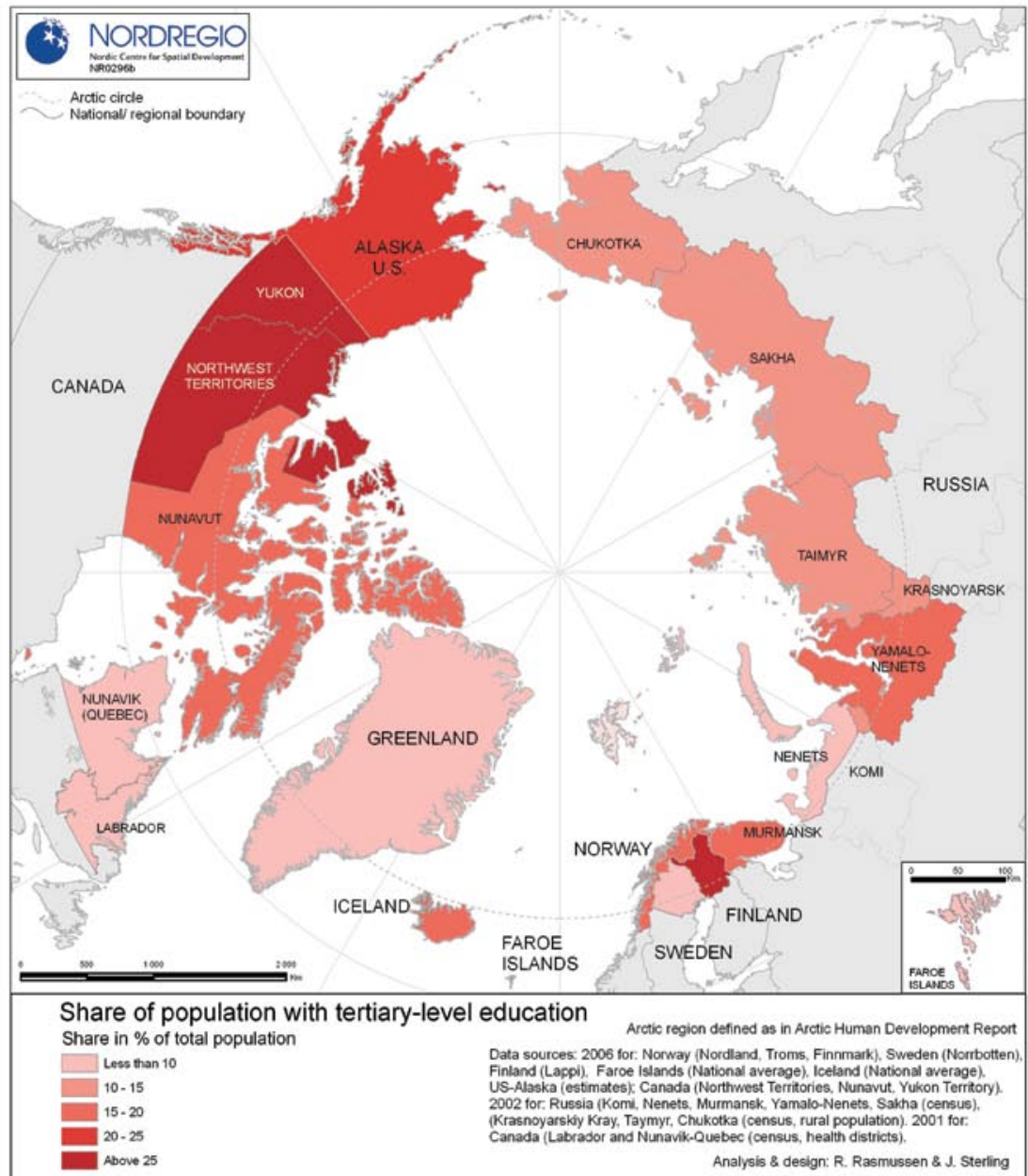
As indicated above, among the most challenging contexts for recruitment to formal schooling in the Arctic are where the economic base is a traditional economy such as subsistence, or a single primary industry, or a mixed small-scale economy. Indigenous groups face severe challenges finding relevant and reliable solutions for their education needs through mainstream infrastructures where they have been historically under-represented in the ranks of college and university graduates in Canada and the United States (Barnhardt and Kirkness, 2001).

Similar understanding has been emphasized by other groups that are left in marginalized

positions, such as rural and remote area inhabitants, as well as linguistic and cultural minorities generally. But most of all the indigenous populations are likely to become marginalized if public and institutional policy regarding formal education ignores the need for a diverse approach to the forms and values reflected in education. In extreme situations, even suicide is contemplated as an “escape valve” (Johal, 2008).

Any formal education system that aims at founding its base on the contextual and cultural base for human development in the North will be confronted with basic processes it needs to manage. These include cultural, ethnic, eco-

Fig 4.6



nomic, and political processes (Darnell and Hoëm, 1996). And as post-secondary education, together with research, is considered as one important vehicle behind the further development of viable societies and communities in the North, formal education is generally expected to strengthen the cultural base for the individual, the community, and the nation.

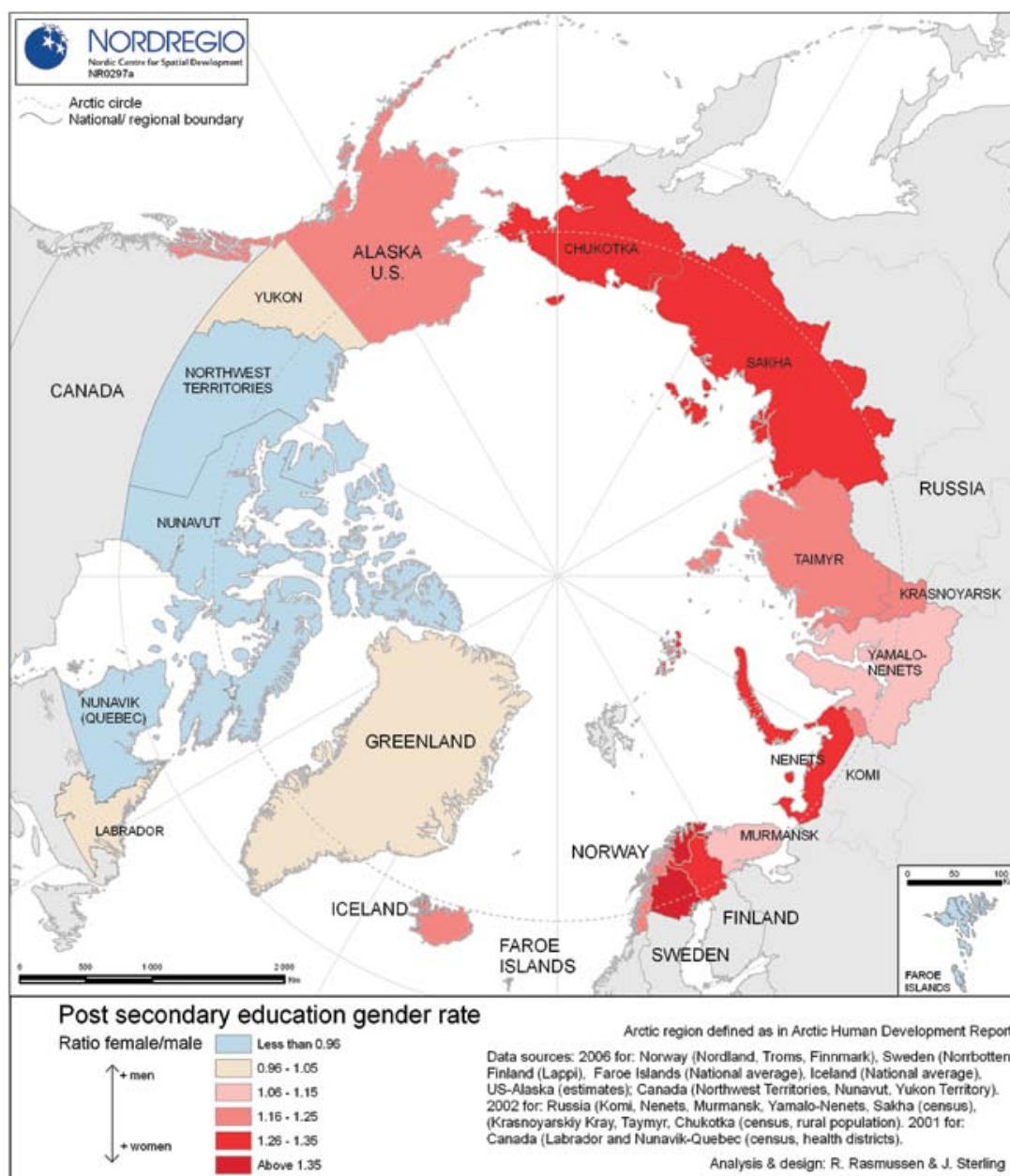
2.4 Post-secondary Education

Regional differences in the percentage of people in the North with post-secondary education are illustrated in Figure 4.5 (see also Figure 4.6 for tertiary education). The circumpolar North has been characterized by very differ-

ent historical legacies of post-secondary education, leading to a situation where the Russian north and the Nordic countries have a relatively high proportion of the population with post-secondary education, while parts of northern Canada and Alaska show a relatively low level. While post-secondary education has been emphasized as an important tool in both regional and minority development in Russia and in the Nordic countries, a similar trend has been missing or been entered into quite recently in substantial parts of the North American continent.

This historic background is also reflected in the ratio of females to males with post-second-

Fig 4.7

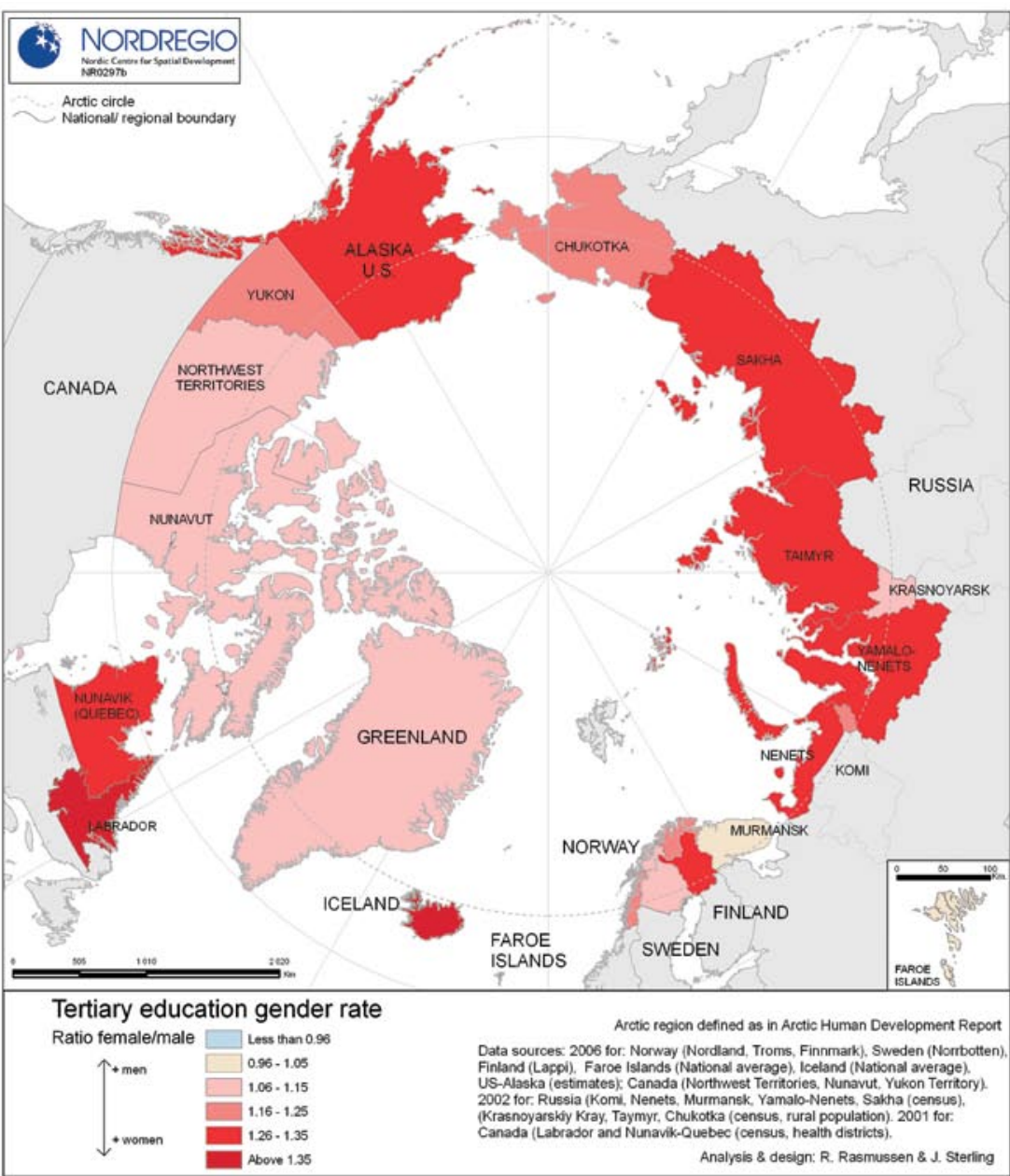


ary education (see Figure 4.7) where the regions with a longer history of developing educational opportunities also show a substantially higher proportion of women with post-secondary education. In general, however, the marked higher share of women compared with men pursuing and accomplishing a post-secondary education has become a general pattern in the Arctic (see also Figure 4.8 on the ratio of females to males with tertiary education).

The differences in gender response to the question of “better opportunities” discussed above has very much to do with the marked changes in patterns of education that have taken place during the last 10 to 15 years. The

pattern shows how women are dominating the realm of education in most of the Arctic. By the late 1990s women had become a majority group in relation to higher education in all regions in the Arctic. The only exception is some parts of Canada where there is a dominance of males in relation to post-secondary education, but this is likely because many young women leave the communities before they pursue their educational goals. A similar situation occurs in the Faroe Islands, where many of the women tend to emigrate, predominantly to Denmark, when they finalize their education to pursue a career in which they are able to take advantage of their acquired skills. This has also been the pattern

Fig 4.8



in Greenland due to a limited acceptance of women with higher qualifications, although in recent years an increasing number of positions requiring higher education have been filled by women.

In communities with a generally high level of persons with high and higher education (urban areas with one or more higher-education institutions), female dominance is limited to a few percentage points. The high level of dominance (i.e., 56% women or higher) appears in municipalities representing small town and urban settings. This dominance occurs in spite of the fact that it is in these same communities where the highest deficit of women appears.

2.5 Potential Indicators of Educational Status and Changes

A number of potential indicators of educational well-being in Arctic communities are outlined in Table 4.1. Both input indicators (i.e., what enables students to enter the education system) and output indicators (i.e., what enables students to accomplish their studies) are highlighted. The table concludes with an overview of the overlaps and problems that have been considered in the process of identifying the chosen indicators.

Table 4.1: Potential Indicators of Educational Well-being in Arctic Communities

Input Indicators	
Availability of early childhood education programs	Adequacy of school funding
Teacher qualification/licensure requirements	Equity of school funding system
Dependence on outside expertise/imported labor for school staff	Proportion of school budget used for instruction
Teacher/administrator turnover rates	Housing availability for educators
Cultural orientation programs for new staff	Quality of school facilities
Proportion of local teachers	Proximity of school to home
Grow-your-own programs	Extracurricular opportunities for students
Proportion of Native teachers in relation to proportion of Native students	Availability of local employment opportunities
Student-teacher ratio	Access to and use of technology
Level of educational attainment of parents	Age distribution of community population
Educational choices available within schools (course/program offerings) and between schools (public/private/alternative/charter/magnet etc)	Degree of local participation in educational decision-making
Availability of curriculum resources and support	Extent of teacher visitation to homes of students
Availability of professional development opportunities	Degree of parent/community involvement in school programs/activities
Availability of specialized support for special needs students (specialists)	Attention to safety considerations in school
Attention to diverse populations (indigenous, language, ethnic, low/high achieving, etc.)	Degree of elder involvement in school
Attention to cultural competence of students	Availability of post-secondary education opportunities
Evidence of attention to local culture in school curriculum	Explicit attention to values in school programs and policies
Use of alternative teaching strategies/Native ways of knowing	Availability of library resources to students/parents
	Value placed on literacy in home
Output Indicators	
Student attendance rates	Indication of positive adult role models for students in school
Student graduation rates (by cohort/graduating class)	Participation of students in extracurricular opportunities
Level of educational attainment of students	Pursuit of post-secondary education opportunities
Student academic performance	Success rate in post-secondary education
School satisfaction rate (proportion of students who are home-schooled; degree of community outmigration to attend better schools	Teen pregnancy rate
Extent that students see themselves in the curriculum	Adolescent suicide rate
Extent that students exhibit sense of identity, efficacy, and pride	Substance abuse rate
	Student use of technology/library resources
Identified Overlaps and Problem Areas	
1. Review the literature. 2. Define the domain. 3. Briefly pare down indicators from brainstorming list to approximately 10. 4. Apply criteria to 10, resulting in about 5 to test. 5. Based on assessment, put forward 1 or 2.	

Based on this broader spectrum of issues indicated in Table 4.1, a set of indicators has been developed, focusing on two sets of requirements. On one hand, the indicators should be simple, available, repeatable, replicable, and comparative. On the other hand, a useful indicator should be able to reflect and indicate changes in the problems outlined above (e.g., identify the tension between local and central control across the Arctic, show how it has affected the direction and quality of northern education, etc.).

3.0 Selected Indicators of Education for the Arctic

Three indicators have been identified: 1) the proportion of students pursuing post-secondary education opportunities; 2) the ratio of students successfully completing post-secondary education; and 3) the proportion of graduates who are still in the community 10 years later. These indicators, however, are not separate entities. Rather, they are progressive and evolutionary, with the first and most basic indicator leading to the second, and eventually to the third.

3.1 Indicator Rationale

Following the review of the efficacy of the potential indicators, we determined that formal education at the post-secondary level to be the single most salient and comprehensive venue for documenting the cumulative effect of all forms of education on individual and community well-being. By focusing on the post-secondary level, we intend to encompass and recognize all forms of educational attainment at an advanced level, including the development of vocational, technical, and subsistence skills and expertise as well as the completion of certificate and degree programs that benefit the individual and the community. Such an indicator also serves as an indirect measure of the overall quality of pre-tertiary educational services, since without strong educational support from early childhood and on through the elementary and secondary schools, post-secondary educational attainment is likely to be weak. Thus a high post-secondary participation and completion rate implies a strong foundation of K–12 educational preparation.

In addition to the post-secondary participation and completion rates, we also have included a measure of the long-term value of the educational opportunities that are available in a community, to the extent that they contribute to long-term livelihood and residency in the home community.

3.1.1 Rationale for Indicator 1

Rationale: *The proportion of students pursuing post-secondary education opportunities*

As Arctic communities have taken on increasing responsibility for the day-to-day affairs that impact people's lives and have asserted self-determination over areas previously governed by outside interests, the need for advanced levels of education has grown accordingly. This situation, in turn, has led to expanding educational opportunities to ever higher levels of knowledge and expertise, as well as efforts to extend those opportunities to an increasingly local level through the use of technology, distance education, and even the development of new locally controlled post-secondary institutions in the North (e.g., First Nations institutes and tribal colleges).

If we are to make a snapshot assessment of the contribution of education to the well-being of a community, it must include taking a look at the highest levels of educational attainment that people are pursuing; anything short of that would present an incomplete picture. In so doing, we are able to make assumptions about the quality of the complete pipeline of educational opportunities, whereas looking at indicators at the elementary or secondary levels alone would be of limited value in assessing the overall contribution of education to long-term community well-being. Thus, obtaining data on the proportion of students from each community pursuing some form of post-secondary education lends itself to making cross-community and cross-national comparisons with relative ease and accuracy.

Such an indicator would also reflect the level of interest on the part of young people to pursue educational goals as well as the extent to which the community promotes education as a means to achieve its own aspirations. Disaggregation of such data along gender, ethnicity, and occupational lines would provide con-

siderable additional insights into the role education plays in the lives of people and communities. It would also be useful to determine the range of post-secondary educational opportunities that are available in a community and the extent to which people are taking advantage of those opportunities. It is possible, for example, for extensive opportunities to be available in a community but few people taking advantage of them because they are poorly matched to people's needs and aspirations. It is also possible that programs are designed and offered in such a way that they are attractive to outside transient members of the community but not to local long-term residents, and thus contribute little to long-term community or cultural well-being.

Besides having high quality, this indicator has other advantages. The data are available for limited cost as they are collected at the administrative level as part of regular registration procedures in the circumpolar North. While the educational structures are quite similar among Arctic countries, there are minor differences in the national regulations regarding a precise age level in determining the shift from secondary to post-secondary education activities. These differences, however, do not have an impact on a comparison of entry level because it is the process of movement from one level of the educational structure to another (not the proportion or age level) that is the decisive factor and which makes the indicator robust. An important quality of the proposed indicator is that it includes both formalized and non-formalized programs. On the other hand, this characteristic also creates its only really weak spot as it remains a challenge to ensure that programs that are not presently formalized and approved be included, even if there are only a few involving a limited number of participants.

3.1.2 Rationale for Indicator 2

Rationale: *The ratio of students successfully completing post-secondary education*

It is one thing to attract people into post-secondary educational opportunities, but that in itself is insufficient to determine the contribution education makes to community well-being. Another question must also be asked: To what extent do students who enter a program

actually complete it? This question is especially important in fields where a credential is required and educational programs lead to a formal certificate or degree.

Many factors can come into play in determining whether a student completes a program:

- *Pre-qualifications:* Poor preparation, particularly in basic skills such as reading, writing, and math, are likely to have a negative impact on completion rates unless efforts are made by education providers to help students overcome such deficiencies in the course of completing a program.
- *Appropriate programs:* To achieve high completion rates, there must be a connection between the aspirations and expectations of the students and the programs available to them. Due to economies of scale, post-secondary program offerings at the local community level are often limited, so students may end up enrolling in a program just because it is the only option available, and then find that it is not suitable to their needs or interests.
- *Institutional support:* Sponsoring institutions need to display commitment and adaptability to support students through to graduation. If the institution takes a sink-or-swim approach with little accommodation to assist students in meeting the demands of the program, the completion rate is likely to be quite low. This factor is especially important with students who are the first generation in their family or community to pursue post-secondary education. Institutions that take an active interest in helping students succeed by offering targeted support services and reaching out to work with students on their own terms will see higher completion rates.

Participation in and completion of post-secondary education opportunities is one sign of a healthy community. As such, these factors together can serve as a reliable indicator of the role of education generally in contributing to the well-being of Arctic communities, especially in small, remote, indigenous communities where education can serve as a vehicle not only for achieving individual aspirations, but for community aspirations as well. Historically,

schooling has been used as a tool for assimilation under conditions of colonial rule. This role is gradually giving way as indigenous people assert their inherent rights of self-determination and put education to use as a tool for empowerment. It is our belief that the education indicators outlined here capture and reflect the significance of such a transformation.

As with the first indicator, collecting the data for the ratio of students successfully completing post-secondary education opportunities is not difficult. They are part of regular registration data and are, therefore, available at relevant administrative levels with limited costs. Again, the difference between various countries' national regulations is not a limiting factor for this indicator, and the same limitations apply regarding the inclusion of non-formalized activities.

A problem, however, that should be considered when comparing the two indicators is the potential mobility during the post-secondary study activity, such as when a student begins studies in one region, but completes the studies in another. Two other factors need to be considered: changes in availability of full programs offered, and changes in student aspiration and options regarding fulfilling programs in the same region as they started. All these factors may have an impact on the robustness of this indicator and should be included when analyses are attempted.

3.1.3 Rationale for Indicator 3

Rationale: *The proportion of graduates who are still in the community 10 years later*

It is of little value to a community to have educational opportunities available locally, only to see graduates of those programs leave the community due to lack of opportunities to apply their knowledge and skills or because of dissatisfaction with the quality of life in the community. Education that leads to a brain drain in the community indicates a poor fit between the educational services being provided and the opportunities and aspirations of the people and community being served. Thus a positive correlation between educational attainment and longevity in the community can serve as a measure of the contribution of education to community well-being. Specifically, the proportion of post-secondary graduates who

remain in or return to their home community is an indication of several critical conditions:

- *The link between educational opportunities and local needs/jobs.* To remain in the community presumes that there is a means of livelihood available that fulfills the needs and aspirations of the post-secondary graduates. Presumably the providers of educational services are cognizant of the employment needs of the community.
- *The community's ability to respond and adapt to new conditions and sustain the quality of life required for a broad range of citizenry.* It also puts upward pressure on the community to provide essential services such as education and health care at a level commensurate with the expectations of its members.
- *The individual commitment to community well-being.* Community retention rates reflect how inclined post-secondary graduates are to apply the knowledge and skills they have acquired in service to the community.

The time frame of 10 years was adopted to allow for the many individuals who leave home to go to school, to work, or to travel, but eventually find their way back to their home community where they settle and raise their family. If such a pattern applies to a particular community, it is a sign of a healthy community, and it is likely to be evident over a 10-year time span.

This third suggested indicator is by far the most difficult to monitor as there is currently no general system available to produce this type of data. However, data access may be feasible: first, several Arctic nations' registration systems may provide the necessary data and second, a question on retention could be included as a simple addendum to already existing surveys.

3.2 Implications of Post-secondary Education for Community Well-being

Viable communities in the North traditionally have had an informal, sound, and reflected adaptive knowledge system. Different concepts (local, traditional, indigenous) have been used to show that communities have accumulated knowledge over generations of living in a particular environment, encompassing all forms of



knowledge – technologies, know-how skills, practices, and beliefs – that enable the community to achieve stable livelihoods in their environment (UNEP, 2008). This situation has allowed groups and whole cultures to survive. This knowledge, however, has not traditionally been integrated into formal education systems, even though it is important for the sustainability in local and indigenous communities of the circumpolar North and should be recognized as an integral part of the formal education.

For many years the informal system has been at risk. The process of modernization and implementation of welfare services may have added to the economic welfare of the population, but also acted as the slow and often invisible forces of change. If changes have been balanced, they may have allowed an adaptive process, merging the different knowledge systems and resulting in a positive outcome. But often large-scale resource exploitation has meant operations based solely on an imported knowledge base. When such imported systems do not coordinate with existing systems, informal knowledge systems may be forced to yield.

Most vulnerable to such forced changes are groups depending on traditional systems to survive. Additionally, implanting new knowledge systems tends, in the long run, to replace traditional systems without acknowledging the need for flexible and adaptive local solutions.

When considering the effects of formal schooling in general, and post-secondary education in particular, there is a need to distinguish between what may be considered a success for the individual alone and what is needed to build sustainable and viable communities. It is also important to examine post-secondary challenges in the North in the context of the most significant features of the Arctic and sub-Arctic regions. These would be small and scattered communities of indigenous populations for which the area is their homeland and that exist on traditional economies. There are enormous resources potentially targeted for exploitation in ways that conflict with the traditional uses and benefits of the land, resources, and the local and the traditional knowledge base. Such exploitation often results in increased pressure on the indigenous and traditional economies

Visit to a reindeer camp near Yakutia, Russia, by participants in a 2003 seminar on Circumpolar Education.

Photo: Local resident

and cultures to become more dependent on imported knowledge production and technology. In the long run, this situation can negatively affect the social system and culture of a community, and it can undo any possibility of producing a positive outcome of modernization.

Formal education must be framed within the wider domains of societal change—changes in culture, social organization, economy, and technology (Hoëm, 1978, 2007; Darnell and Hoëm, 1996; Barnhardt and Kawagley, 2004). Also important is the interplay of processes within and between these domains, their impacts on the potential role of the education system, and the changes within the domains that happen at a different pace. Change in technology appears frequently and with rapid progress. Changes within culture and social organization occur gradually. In addition, the changes that take place occur in diverse ways in different societies. The particularity of the changes that occur in each society is driven by the specificity of the changes within and between the domains. If the formal education system is understood both to serve and to manage such processes, it must reflect and be based on these realities, be it at a micro level related to the local community, or at the macro level consisting of a larger regional entity or the whole nation-state. Variety needs to be met with variety if we are to achieve equity.

Higher education can contribute to a positive identity formation for the individual and build sound cultural capital for the integration of the people into the wider surroundings, based on understanding the totality of the individual and community needs. Therefore, the social, cultural, political, and economic outcomes are connected to the expectations of a formal education system. But, as emphasized by the Saami political arena, the education system needs to focus on the communities themselves being in control of the knowledge and competence (Sami Parliament Council Political Program, 2006-2009). Such local and regional knowledge production provides an opportunity to build a bridge of legitimacy between school and society. Such a bridge must be manufactured to also accommodate knowledge exchange allowing a two-way lane. That is, there should be an exchange relationship between the educational

system and the community, and between the local and regional knowledge systems and the wider contexts.

Barnhardt (2005) suggests a similar systemic integration between a native knowledge stream and a western science knowledge stream. An illustration of such an approach is the Sámi University College's Bachelor in Reindeer Husbandry founded on both science-based knowledge and traditional knowledge. The students learn to identify and analyze those two knowledge systems within reindeer husbandry locally, nationally, and internationally (www.samiskhs.no/article.php?id=241). The bridge should contain enough lanes to fulfill all expectations, including the cultural and the instrumental capacity needs. The cultural expectation of the system is that a formal learning journey as an activity in itself contributes further to building sound, balanced human beings. In its broadest sense, such education itself is culture.

3.3 Implications for Promoting Retention/Graduation

Retention indicates how well the education system is able to hold students as they progress through the planned path to graduation. It is a measure of whether the system fulfills the expectations to serve as a vehicle for capacity building for the society as well as for adding value for the individual student. It contains indications of the degree of participation and completion at the different levels of the education process; a high level of participation and completion at post-secondary level (tertiary level) is an indication of a high retention rate at the elementary and secondary as well as at the post-secondary level.

Policies promoting retention based on this view contain a systematic approach to addressing retention problems for different stages of the education process. As such, the retention/graduation rate is an indication of both student and institutional performance. However, an understanding of the causes and the effects of the rate requires contextualized knowledge and understanding of the local situation. Dropping out is usually interpreted as a failure of the individual student, but by extension it also tends to be explained and generalized to reflect patterns of whole groups. For example, stu-

dents from low socioeconomic backgrounds are often identified as “at risk,” as are students from rural and isolated areas, and ethnic, indigenous, and linguistic minority groups.

The traditional way of measuring educational retention is to determine the proportion of those who start a program and continue until they have completed it. However, these measures can easily be distorted by defining retention in reference to semester-by-semester or year-by-year completion rates. Given the high dropout/low retention rates associated with some programs and certain student populations, it is important to focus on final graduation figures for a cohort of students to get an accurate picture of program success based on actual completion.

Community well-being can be tied to post-secondary success in different ways. Viable communities need access to a certain kind of public service that highly depends on professionally trained people. A workforce skilled both in their profession and trained to work appropriately in the linguistic and cultural setting is an incitement for community well-being. Viable communities will also foster candidates for higher education and contribute to a varied and diverse workforce for the future.

In the international literature (see for example Braxton, 2000) it is usual to distinguish between academic factors and non-academic factors, and the social integration of students into the college and university community. Findings suggest that retention programs that focus primarily on helping students master course content alone may only address immediate rather than longer-term deficiencies. Students who master course content but fail to develop adequate academic self-confidence, academic goals, institutional commitment, achievement motivation, and social support and involvement may still be at risk of dropping out. As indicated by these examples there are many possible ways to focus on student retention, which must also be understood in the wider context, covering macro and micro measures, to increase student recruitment and fulfillment from groups that have not had the tradition of post-secondary education.

In the high Arctic the pattern historically has been that accessing post-secondary education

meant exporting the potential future intellectual capacity from the North to higher education in the south. Where there were candidates for higher education, the tendency was for the individual to leave the community and submit to a cultural makeover, in many cases not to return with the achieved professional skills that could have been of value to the community. This indicates challenges both at the individual level and at the institutional level, as illustrated by Barnhardt and Kirkness (2001) who emphasize that from an institutional perspective, the problem has been typically defined in terms of low achievement, high attrition, poor retention, weak persistence, etc., thus placing the onus for adjustment on the student. Seen from the perspective of indigenous students, however, the problem is often cast in more human terms, with an emphasis on the need for a higher educational system that respects them for who they are, that is relevant to their view of the world, that offers reciprocity in their relationships with others, and that helps them exercise responsibility over their own lives.

There are existing post-secondary institutions in the Arctic that either by campus or program location and/or through adapted delivery systems try to improve accessibility. The University of the Arctic (UArctic), an umbrella organization of more than 100 universities and colleges in the circumpolar North, has improved accessibility to programs through exchange opportunities and distant delivery of courses. As of 2008 UArctic is moving into a next stage by revising its strategic plan focusing on critical future challenges in the North for the members to solve through joint efforts. Its member institutions have committed to join the UArctic charter and the UArctic value system, which also include accessibility increase.

Possible examples of post-secondary education policies that address cultural differences, particularly for indigenous peoples, may be found in many of the Arctic regions. There are also some small but rather specialized colleges featuring a distinct linguistic and cultural profile. There are university campuses with research centers that focus especially on indigenous research and programs, and training centers that are tied into university- and college-level delivery programs. The current systems

also contain different kinds of post-secondary program delivery, ranging from combinations of flexible teaching/learning platforms to traditional classroom-delivered courses.

There are no current data on the degree to which the faculty composite of the programs linguistically and culturally is able to match the rather diverse student body of indigenous peoples of the North. Still, the existing system of post-secondary education is fighting severe challenges.

4.0 Concluding Comments

Table 4.2 below summarizes the main questions in relation to accessibility and generalization of the suggested indicators. The first two indicators are highly accessible, affordable, and easy to access; the third is possible to generate. It would, therefore, be possible to provide not only updated and comparable data, but also to ensure future access that may provide an excellent tool to monitor state-of-the-art situations and provide time series for analyses that would be important in connection with future policy measures.

By means of the three indicators outlined above, we are able to provide a rather precise indicator of both individual and community well-being and responsiveness to contemporary challenges and changes. Further, by means of status of enrollment in post-secondary education, we are able to make assumptions about the

quality of the complete pipeline of educational opportunities and cross-community and cross-national comparisons with relative ease and accuracy, reflecting the level of interest on the part of young people to pursue educational goals, as well as the extent to which the community promotes education as a means to achieve its own aspirations.

This information, along with data on completion rates, indicates the level of pre-qualifications a student has acquired prior to entering a program as well as the individual and community measures to help students overcome such deficiencies in the course of completing a program. Completion rates also provide a measure of the extent to which there is a connection between the aspirations and expectations of the students and the kind of programs that are readily available to them, just as it is a reflection of commitment and adaptability on the part of sponsoring institutions to support students through to graduation. As discussed above, participation in and completion of post-secondary education opportunities can be seen as one sign of a healthy community, and as such can serve as a reliable indicator of the role of education generally in contributing to the well-being of Arctic communities.

Finally, the return rate is an indication of a link between educational opportunities and local needs/jobs. It is an indication of the community's ability to respond and adapt to new conditions and sustain the quality of life

Table 4.2: Education Indicator Matrix

Indicator	Data Availability	Data Affordability	Ease of Measurement	Robustness	Scalability*	Inclusiveness
Rationale for Indicator 1: <i>The proportion of students pursuing post-secondary education opportunities</i>	Tier 1	√	High	√	(1, 2) 3-5	√
Rationale for Indicator 2: <i>The ratio of students successfully completing post-secondary education</i>	Tier 2	√	High	(√)	(1, 2) 3-5	√
Rationale for Indicator 3: <i>The proportion of graduates who are still in the community 10 years later</i>	Tier 2/3	√?	Medium	(√)	(1, 2) 3-5	√

• 1 – scalable to individual; 2 – scalable to household; 3 – scalable to community; 4 – scalable to region; 5 – scalable to country
Note: Parenthetical numbers in the Scalability column indicate some uncertainties. The question mark in the Data Affordability column indicates that data might be generated at very high costs.

required for a broad range of citizenry. It is also an indication of individual commitment to community well-being to the extent that the post-secondary graduates are inclined to apply the knowledge and skills they have acquired in service to the community.

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5 Cultural well-being and cultural vitality

Peter Schweitzer, Stephanie Irlbacher Fox, Yvon Csonka, and Lawrence Kaplan

1.0 Introduction

The Arctic Social Indicators (ASI) project domain of cultural well-being or cultural integrity/cultural vitality was formed based on the conclusions of the *Arctic Human Development Report* (AHDR). The report concluded that “maintaining cultural identity” was one of three dimensions of human development that residents of the Arctic recognized to be relevant over and above the dimensions included in the

United Nations Human Development Index (AHDR, 2004).

Instead of “maintaining cultural identity,” which seems to refer to a conservative notion of culture, we considered the notion of “cultural integrity,” defined as the ability of a culture to retain fundamental elements over time. This focus is relevant because many indigenous cultures have been under siege from intrusive outside influences for the past 60 years, and in some regions for much longer. An alternative

Sahtugotsine Dene drummers at Deline, NT, Canada June 2007.
Photo: Stephanie Irlbacher Fox



term we considered, “cultural vitality,” had the advantage of encompassing the innovating and dynamic aspects of culture without ruling out cultural retention over time. In the end, however, the phrase “cultural well-being” was adopted in reference to mainstream quality-of-life research. It presents the advantage of neutrality with regard to the above-mentioned value-laden debate regarding the “traditional” versus “innovative” aspects of culture.

These remarks underscore the importance of defining culture, a concept about which volumes have already been written. For our purposes, the following assumptions served as starting points:

- Culture can be seen as sets of rules and values shared by a given society.
- Arctic societies are groups ranging from co-residents of a settlement to ethnic groups and nations.
- Arctic culture refers to shared rules and values of these diverse (Arctic) societies (AHDR, 2004).

Resulting from our broad definition of culture is a multidimensional understanding of cultural well-being and cultural vitality. We identified for our purposes the following dimensions of culture:

- Language (its use and retention)
- Knowledge (and its transmission)
- Communication (including education and performance)
- Spirituality, such as religion and ritual
- Sociocultural events and media
- Economic and subsistence practices
- Social organization, institutions, and networks

Social science theorists have long ago acknowledged that dimensions of culture such as those listed above cannot be mutually exclusive as they manifest themselves in “total social facts” (Mauss, 1923-24) that can be apprehended only through a holistic perspective. Thus, some of these dimensions are already being addressed, and sometimes better addressed, by other ASI domains. This underlines the necessity for all domains to work in concert and in

close consultation to create synergies and avoid overlap.

1.1 The Concept of Cultural Well-being

Given the complexity of the concept of culture, the challenge is to determine an appropriate indicator of cultural well-being. This is a tremendously difficult task. An indicator is meant to monitor social conditions and social change (Bauer, 1966). In this domain, the task is to identify an indicator that will measure conditions and cultural change over time. It must be valid throughout the circumpolar world, for long periods of time, and for all peoples. It must relate to the phenomenon of culture itself or to aspects of northern culture and cultures.

Any indicator of cultural integrity may not apply equally to all societies of the Arctic. The greater the degree of self-governance of a society, the more we can expect the society to pursue what it deems adequate for its cultural well-being and for the maintenance of its group identity. Self-governance provides no insurance against rapid cultural and social change, but it may offer a degree of buffering against some of its unwanted consequences. Self-governance may also allow cultural autonomy to find expression in domains such as justice, forms of governance, and economic development, to name but a few.

One way to monitor cultural integrity in the many distinct Arctic societies that do not enjoy a high degree of self-governance, such as ethnic minorities, is to construct a composite indicator that accounts for the diverse dimensions of culture. Whereas expressions of satisfaction (or lack of same) with cultural conditions can be elicited only through expensive and limited surveys, cultural integrity can be evaluated with the help of data that are regularly collected by national or regional governments, such as information on language vitality, and by the ranking of local or regional policies and social realities that influence levels of cultural integrity.

1.2 Overview of Cultural Well-being in the Arctic

Many of the societies identified in the AHDR, such as indigenous, old settler, Métis, and generally all long-term Arctic residents, have cultures, and sometimes also languages, that are



Large apartment blocks built in Greenlandic towns (here Nuuk) in the 1960s and 1970s are visual reminders of recent transformations, which were too radical for some Arctic residents to cope with as they were imposed.
Photo by Yvon Csonka in 2004.

distinct from those of the southerly parts of the country they inhabit. The distinctiveness of these cultures can be linked to the particular ways of life evolved by Arctic peoples to cope with living off the land in their demanding environment, to the longstanding isolation of their remote peripheries, and to the fact that many Arctic societies are Aboriginal and have been in contact with Western cultures for a relatively short period. Cultural integrity and associated well-being are unequally distributed throughout the Arctic today. For some societies, it has been and remains an issue of cultural survival, a politically loaded expression sufficiently common for it to be evoked here.

The very inclusion of cultural well-being among the dimensions of human development in the Arctic region stems from the recognition, in the chapter “Societies and Cultures” of the *Arctic Human Development Report* (2004), that since World War II some societies have been undergoing very rapid changes that have acutely affected their cultures and the identities

of their bearers. Several aspects of encroaching modernity drove these transformations. One of them was the rush to exploit the non-renewable resources of the North, generally with little regard for environmental consequences or impacts on indigenous societies. Another was the spread of welfare state policies. Directed at indigenous peoples, these policies arose from paternalistic attempts at social engineering. In several countries, the goal was to assimilate the indigenous populations, as exemplified by the policies of Norwegianization, Russification, or Canadianization. In the Soviet Arctic, planned social change was based on Marxist-Leninist ideology.

Most of the social and cultural changes in the post-war era were directed by government agencies. Many of them, such as the provision of education, health care, and welfare, had ethical justifications. Even though some of these changes were for the better, the way they were imposed led to a loss of control over local affairs and over collective and individual destinies. In small northern settlements, local people could

not escape the impression that they were watching helplessly while things were being done around them and supposedly for them. The feelings of estrangement caused by the loss of control over changes in turn contributed to the rise of social problems, such as suicide, violence, law-breaking, and alcohol abuse.

The decades around the middle of the 20th century were for many northern indigenous peoples the period in their histories when they had the least autonomy and, simultaneously, were undergoing the farthest-reaching changes they had ever experienced. Later on, with the hope of regaining some autonomy, came the reaffirmation of identities, cultures, and sometimes also languages. But cultural reaffirmation, although it does make reference to roots in the past, is not a return to traditions in the sense of simply reactivating previously existing customs. Rather, it is an active re-creation of culture and symbols, whose functions in current contexts differ from those they had a few decades earlier.

Thus, cultural well-being as an issue of human development in the Arctic stems from historical developments, some at longer time scales, such as the colonization of indigenous peoples by southerners, and others at decadal scales, such as the enforced march toward modernization of the late 20th century. Changes of the past few decades fostered the degradation of the cultural well-being of some societies. In this context, the purpose of an indicator should be to monitor the return to more satisfactory conditions, whatever direction and shape future cultures may take. Obviously, cultural well-being is closely linked with the potential for self-governance for societies, including minority societies within large nations.

2.0 Possible Cultural Well-being Indicators

While the term “culture” cannot be assigned a comprehensive definition, part of the task at hand includes identifying one or more indicators, each providing universally intelligible measures of cultural wellness across circumpolar populations. Without making any claims about the comprehensiveness of the measures recommended for consideration, culture is con-

ceived of here not in a definitional sense, but rather as a concept inclusive of several dimensions that could be both easily assessed and would represent prominent and universal dimensions of the concept of culture. Dimensions of culture most easily assessed are those already subject to either some sort of measurement by national governments or for which the raw data exist in each circumpolar country and are publicly accessible.

Deliberations toward identifying an indicator combined open discussion, brainstorming, and synthesizing ideas around the concept of culture, its relative importance among various circumpolar populations (indigenous or Aboriginal, non-indigenous/Aboriginal, youth, religious), the vitality of culture among various populations, and the variety of cultures in increasingly global and technologically influenced circumpolar areas. Participants in the discussions represented a cross-section of social science researchers working in Arctic Canada, the US, and Greenland. The initial questions examined included the following:

- What is meant by culture?
- What are its dimensions?
- How can these dimensions be measured?
- What are the indicators we see in the everyday of cultural wellness?
- What indicators are adopted internationally with respect to cultural wellness assessment?

Initial discussions in a workshop in 2006 identified key areas for social indicators that should be explored. The indicator that emerged as the leading contender for cultural well-being was the use and retention of language. Participants agreed that whether indigenous or non-indigenous, language holds extensive and profound cultural knowledge and functions as a link between generations necessary to the practice and retention of cultures. Participants also agreed that language is, in this sense, a facilitator of culture among and between cultural communities (Rushforth, 1981; Rice, 1986).

When considering populations in the circumpolar North, the participants reached a consensus that cultural well-being generally is a concern perhaps felt most keenly by minority cultures and in particular by those cultures



targeted by state policies of cultural assimilation. Examples come to mind such as indigenous peoples whose occupancy and use of lands and resources resulted in rights or ownership assertion often in the way of state formation or capitalist development. Indigenous peoples have often been subjected to discrimination, oppression, and cultural assimilation, and only in recent decades have they begun to recover successfully (Maybury-Lewis, 2002). Other minority populations include Métis or old settler populations that have developed distinct languages, identities, and economic and cultural practices (Ssorin-Chaikov, 2003; Thompson, 2008).

Indicator categories were identified that could indicate well-being or vitality of culture and cultural practices. Dimensions of culture could include communication (including education and performances), spirituality (religion, ritual), sociopolitical and economic practices (events, media, subsistence), and social organization, institutions, and networks. Some of these dimensions are among those being

addressed in other indicator domains, including education and fate control.

Part of the value of an indicator for cultural well-being is its universal applicability. We recognize that no society is of a uniform culture: in an increasingly technologically accessible, physically mobile, and virtual world, identifying an indicator relevant to all ethnic, age, gender, and occupational groups within societies poses a challenge. Within given cultures, there is also often great diversity in understanding traditional versus contemporary cultural practices. Indicators should not emphasize or bestow privilege on certain groups or sectors of a society. For example, youth participation in cultural activities seems to be higher in those activities associated with cultural change, development, and transition. In contrast, adults and elders tend to gravitate to activities associated with cultural preservation and/or transmission. Participation in cultural activity may also vary along gender lines.

How data might be gathered for potential indicators is another key consideration. Resources

The strong sense of 'belonging', especially in smaller communities such as Siorapaluk in North-west Greenland, the northernmost permanently inhabited settlement, is counter-balanced by government policies, even in a self-governed country like Greenland, that channel public investments to bigger towns. *Photo by Yvon Csonka in 2007.*

must be available to gather data at the same scale and temporal frequency across the circumpolar world. This criterion further narrowed the potential suite of indicators:

- How applicable is it to whole populations rather than sectors (i.e., is it something that is universal)?
- How accessible are the data (i.e., are data currently being tracked in all regions/countries in forms that can be converted to meaningful aggregate data)?
- How generalized are the phenomena (i.e., tracking language retention rates is more easily done than tracking spirituality retention rates)?

Several indicators correlate with dimensions of culture universally recognized as important. Indicators meeting the above criteria would relate to language, probably regarding its use and/or retention.

Advocating for an indicator that focuses on language is not without its drawbacks. First, languages of the majority populations are not under threat (e.g., Russian in that country's far North, or English in northern Canada or Alaska). Second, critics may view a focus on language as essentialist in the sense that it is not expressive of the dynamism of culture generally; nor is it indicative of cultural stresses such as suicide rates or rates of violent death. The inevitable turn to language as a viable and informative indicator, however, rests on its ability to meet all criteria. All people speak a language; the extent to which people speak their mother tongue is a meaningful measure of cultural wellness no matter the proportion of the population that group might be; the concept of language is universally recognized, so there is no debate over what constitutes recognized languages; and most importantly, the languages their populations speak are the subject of both interest and regular quantification by all circumpolar states.

Another dimension of cultural vitality seemed encompassed by cultural events and performances, which can be tracked through the number of events per year and community (adjusted for population), the number of participants in cultural events, or participation rates in the production of cultural artifacts. For the complex

domain of spirituality, the simple proxy of participation rates in spiritual activities was suggested. Finally, the number of print and broadcast media productions per community (adjusted for population) was also discussed as a potential indicator.

In these discussions, general concerns included data challenges (their availability and quality), the fact that some of these indicators made sense only for indigenous peoples, and that all these dimensions could vary according to ethnicity, age, gender, and occupational status. A subsequent workshop in the summer of 2007 resulted in a much more focused view of possible indicators. At that workshop, we identified three potential classes of indicators:

- First, a number of language indicators seemed a commonsense approach to addressing culture. We determined that language was perhaps the most intuitively obvious potential indicator. However, many dimensions of language vitality might be measured (see the section on language below for further discussion).
- Second, we considered a composite indicator (a table marking the presence and absence of traits) of cultural autonomy consisting of opportunities, institutional conditions, legal frameworks, etc. We realized that this indicator is also fairly bounded and clearly identifies the information relevant for its assessment. Also, gathering data for such an indicator would be relatively easy and the data would likely be non-controversial. This presents possibly the best example of an indicator easily comparable across nations, regions, and localities.
- Third, we looked at the notion of "belonging" as a cultural indicator. This is the most difficult arena for indicator construction, as the original idea of measuring (and ranking) the proportion of "long-term stayers" within a community has been discarded as too ambiguous. (This notion is discussed further below.)

2.1. Language Indicators for Cultural Vitality

The status of indigenous languages, including the extent and role of their use, provides a useful indicator of cultural well-being for Arctic

peoples – provided we consider Arctic languages per se and not languages that recently moved into the North due to colonization and assimilation of northern territories. Cultural maintenance can be considered to correlate to a large extent with cultural well-being, and language maintenance is verifiable and quantifiable in ways that would make it an appropriate indicator. Additional language indicators address political and social realities of indigenous languages.

The Survey of Living Conditions in the Arctic (SLiCA) provides data on language use and ability for the Inuit world. Three of their result tables are reproduced below to demonstrate some of the differences, even within a fairly homogeneous culture (and language) area (see Tables 5.1, 5.2, and 5.3).

2.1.1 Language Vitality

Language vitality can be considered an indicator of cultural vitality. Some northern indigenous communities fully retain their native language, whereas others are in the process of shifting to a European language. In the earlier stages of language shift, older people typically know and use the native language (either monolingual or bilingual, but native-language dominant), while younger generations are bilingual but not native-dominant. As the shift progresses, the older generation eventually becomes bilingual but dominant in a European language, leaving the younger generation with a slight and mostly passive knowledge of the indigenous language.

Although there do exist populations of balanced bilinguals, where no language shift

Table 5.1: Indigenous Language Use as a Child by Country

	Canada	Greenland	Chukotka	Alaska	Total
Learned indigenous language as a child	*	95%	67%	61%	83%
Indigenous language spoken by parents at home when respondent was a child	*	93%	64%	76%	83%
Indigenous language spoken by parents to child at home when respondent was a child	*	90%	56%	59%	76%
Estimated Total	*	39,732	20,713	11,085	71,530

* Data not available

Source: Poppel et al. Reproduced with permission.

Table 5.2: Indigenous Language Ability by Country

	Canada	Greenland	Chukotka	Alaska	Total
Understand very well	79%	73%	40%	39%	60%
Relatively well	13%	24%	18%	15%	21%
From not at all to with effort	7%	3%	42%	46%	19%
	100%	100%	100%	100%	100%
Speak very well	77%	71%	37%	32%	56%
Relatively well	12%	25%	17%	12%	21%
From not at all to with effort	10%	5%	45%	56%	23%
	100%	100%	100%	100%	100%
Read very well	52%	62%	25%	13%	45%
Relatively well	18%	26%	17%	16%	22%
From not at all to with effort	31%	12%	58%	71%	33%
	100%	100%	100%	100%	100%
Write very well	54%	58%	24%	11%	42%
Relatively well	19%	26%	15%	11%	21%
From not at all to with effort	27%	15%	61%	78%	37%
	100%	100%	100%	100%	100%
Estimated Total	19,870	39,629	20,417	10,957	90,873

Source: Poppel et al. Reproduced with permission.

Table 5.3: Summary of Current Use of Indigenous Language by Country*

	Canada	Greenland	Chukotka	Alaska	Total
All of the time	**	35%	2%	1%	20%
Most of the time	**	43%	13%	9%	29%
Some of the time	**	17%	17%	30%	20%
Very seldom	**	4%	23%	45%	16%
Not at all	**	1%	45%	16%	15%
	**	100%	100%	100%	100%
Estimated Total	**	34,990	18,678	10,946	64,614

* Index constructed as sum of household, work, school, other divided by 4 & rounded

** Data not available

Source: Poppel et al. Reproduced with permission.

appears to be in progress, a maxim of those who study language planning is that stable bilingualism does not exist without *diglossia* (i.e., where defined roles for each language are adhered to by the community of speakers). This often occurs in religious communities; for example, orthodox Hasidic Jews use Hebrew as a strictly religious language and Yiddish as a strictly secular language, often alongside English or another national language. Diglossia can also be observed in the use of colloquial and classical Arabic in much of the Arabic-speaking world, although classical Arabic has more than solely religious functions (Fishman, 1991; Dorais and Sammons, 2002).

Northern indigenous languages, however, typically do not develop well-defined situations of diglossia. Instead, one language – often the European one – is used for so-called high functions relating to government, education, and media, while the indigenous tongue is used for “low” functions, typically intimate, home, and community uses (Cooper, 1989; Paulston, 1994).

The vitality of indigenous languages can be evaluated either by finding the percentage of speakers relative to the total population or by determining the average age of the group of youngest speakers. Both measurements indicate whether a population is in the process of language shift and the extent to which the shift has progressed. Various relevant data exist: the Survey of Living Conditions in the Arctic (SLiCA) project has measured language vitality and use in a number of ways (the SLiCA Cultural Continuity Tables 87-114 treat various dimensions of indigenous language use), and US census figures include speakers of languages

other than English, along with people’s ethnic identification (although speaker numbers do not always appear credible, because they seem high in many cases, such as in Alaska).

There may be many reasons for variations in numbers. Someone whom a linguist considers to be a speaker of a language may not self-identify as a speaker in a community where the language is closely associated with the knowledge of elders, which would of course lower the speaker count. In the case of high speaker numbers, as with the census, people may identify themselves as native language speakers even when a linguist or others may not consider them so. This issue may arise because the meaning of “speaker” varies. To a linguist, a speaker generally would be considered someone who is able to hold a conversation in a language, even if the person at times hesitates or doesn’t use a highly conservative form of the language. People may self-identify as speakers if they 1) know some of the language, such as individual words, 2) can pronounce and read the language out loud, and 3) feel an ethnic identity that causes them to want to identify as speakers even if they possess little actual knowledge of the language. The background or motivation of the census taker can be a factor as well. Language status can be a political issue involving funding and other issues, and there may be a desire to boost individual or group standing (Cooper, 1989).

Michael Krauss has provided estimates of speaker numbers for Alaska, updated in a recent article (Krauss, 2007). To arrive at his estimates, essentially he determined language status for individual villages through reports by knowledgeable people on the age range of the youngest native speakers and the oldest non-

speakers. Census data were examined and figures noting the percentage of population in various age groups were applied. While this method is not as accurate as a speaker count, it provides a reasonable estimate, since speaker counts can vary widely depending on who counts and how people identify themselves (see above).

There are reasonably reliable speaker numbers for Alaska, Greenland, Canada, and Russia. Where statistics are lacking, the method just outlined, however, can still be applied through the use of reliable census figures coupled with estimates of the ages of the youngest speakers. Estimates also exist for Siberian Eskimos and perhaps for other groups as well.

It may be that the actual percentage or number of speakers is not as important an indicator of cultural well-being as the issue of whether a given community is in the process of language shift or not. If there is no shift to a European language and away from the indigenous language, this aspect of cultural maintenance is present. If language shift is underway, then the precise progress of the shift may not be highly important, as experience leads us to expect the same sorts of results across geographic boundaries and regardless of the age of the youngest speaker.

Table 5.4 enumerates language retention rates for a variety of Arctic languages.

2.1.2 Official Status, Public Use, and Education

Another category of indicators related to language involves a number of measurable facts about the legal status of minority or indigenous languages as well as their use in education and other public forums, such as in media and publications. This category of measurement echoes an awareness of the importance of state recognition for the fostering of cultural development, a consideration that is further developed below (see “Cultural Autonomy”).

Official government recognition of indigenous languages, including their use in education, may take a variety of forms. In some cases, an indigenous language may share status as a co-official language, typically with a European language, such as Greenlandic and Danish in Greenland. There may be regional status,

such as in the case of Inuktitut, which has official status in Nunavut but is not an official national language of Canada. In Alaska no indigenous language has official status at the national or state level, although some languages are given official local support, such as Inupiaq in the North Slope Borough.

Table 5.4: Arctic Language Retention Rates

Language	Total Population	No. of Speakers	% Retention
Ahtna	500	80	16%
Aleut	2,300	150	7%
Alutiiq	3,500	200	6%
Central Alaskan Yupik	25,000	10,400	42%
Chipewyan	6,000	4,000	67%
Chukchi	15,000	10,000	67%
Deg Hit'an (Ingalik)	250	14	6%
Dena'ina	1,000	50	5%
Dogrib	2,400	2,300	96%
Dolgan	7,000	5,700	81%
Enets	200	50	25%
Even	17,000	7,500	44%
Evenk	30,000	9,000	30%
Eyak	50	0	0%
Faroese	47,000	N/A	N/A
Finnish	ca. 5,000,000	N/A	N/A
Gwich'in	3,000	550	18%
Hän	300	15	5%
Holikachuk	180	5	3%
Icelandic	290,000 N/A	N/A	
Inuit	93,200	73,600	79%
Kaska	900	400	44%
Karelian	131,000	62,500	48%
Kerek	400	2	1%
Ket	1,100	550	50%
Khanty	21,000	12,000	57%
Komi	344,500	242,500	70%
Koryak	9,000	2,700	30%
Koyukon	2,300	300	13%
Mansi	8,200	3,100	38%
Nenets	35,000	28,500	81%
Nganasan	1,300	500	38%
Norwegian	ca. 4,500,000	N/A	N/A
Saami group	57,200	26,100	46%
Sakha (Yakut)	382,000	358,500	94%
Selkup	3,600	1,570	44%
Siberian Yupik	2,300	1,300	57%
Slavey	5,200	3,900	75%
Swedish ca.	9,000,000	N/A	N/A
Tagish	400	2	1%
Tanacross	200	50	25%
Tlingit	11,000	375	3%
Tutchone	2,500	400	16%
Tanana	400	15	4%
Upper Kuskokwim	100	25	25%
Upper Tanana	300	55	18%
Yukagir	900	70	8%

Sources: Dolgan, Karelian, Komi, and Sakha from All-Soviet Census for 1989. Alaskan data from Krauss, 2007. All other data from AHDR, 2004. No language retention data available for Faroese, Finnish, Icelandic, Norwegian, and Swedish.



Trilingual sign with Inuktitut, French, and English on a street in Kuujuaq, the largest town in Nunavik, located in Northern Quebec, Canada. Photo by Lawrence Kaplan

This status can be readily determined in different regions and for different languages, although situations can be hard to compare internationally and even within a single country since different governments have different legal bases for language recognition; no two cases are exactly the same. Some areas, for example, have bodies known as language commissions that oversee language use. In others, the use of an indigenous language in government and legal proceedings as well as in official documents is an appropriate indicator of status. Whether a language is official is not a simple yes-no question, and differing levels of status need to be described and recognized.

There is also much gradation concerning the place of various languages in educational efforts. In Greenland, the indigenous language is the majority school language, whereas in Alaska, indigenous language instruction in schools varies widely from full bilingual education programs in Yupik first-language locales, to short classes a few times a week, to no indigenous language instruction at all. Where indigenous language instruction is not required, some children will be offered it and some will

not, even in the presence of well-developed school programs. Again, situations may vary widely, so categories would need to be set up and applied to different cases (Dorais, 1990).

A study of language use in the media can indicate whether a particular tongue is in active use by the local population and has enough political clout to be used in broadcasting or the press. Many areas have local radio in an indigenous language, and some even have television; this is a strong statement, since television is expensive to produce and therefore needs to address a more sizable audience than radio. The same is true for newspapers, which are only useful for populations who understand the written form of a language.

Economic issues may also require media to be economically viable, perhaps self-supporting. Economic viability for indigenous-language media would make a strong statement about the status of a language, although subsidized media also point to strong support by government (or some other organization) in spite of lack of self-support.

A related question involves the rate of publication in the indigenous language, which can also be taken as an indicator of cultural well-being. A high rate, of course, points to wide knowledge and use of the language along with strong literacy among the target population. To measure the rate it is possible to count the numbers and categories of books, periodicals, etc. published in a particular language. Are there publications on creative writing, science, news, poetry? Are these publications bilingual? Other measures include a range that may be viewed on a continuum of efficacy for achieving cultural autonomy goals, such as, in the Russian context, *obshchinas*. An indicator for public use of language and dissemination through the media might also include an assessment of the availability of forms of popular culture employing the language; presumably such use would make indigenous language appealing to younger generations and indicate cultural vitality, since the language would not be perceived as an artifact of elders and of a bygone era.

2.1.3 Limitations on Data

The Arctic Social Indicators project has established criteria to determine the suitability of

proposed indicators for existing and ongoing measurement across all circumpolar nations. In the case of language, these criteria are the following:

- All national censuses record language use and make the information publicly available.
- Arctic nations track language use and retention among indigenous populations.
- Fundamental aspects of language data information are consistent across nations collecting the information.
- Arctic nations may be open to special data tabulations.

2.2 Cultural Autonomy

Over the past few decades and centuries, many Arctic societies, especially indigenous ones, have been under pressure to change. Most nomadic populations have been made sedentary in communities, where most aspects of daily life were utterly foreign. Religion, social organization, education, language, economic activities, health care, housing, movements, technology, food, justice, etc., are all just aspects of culture. Changes to any or many of these aspects – which often occurred simultaneously and with little control from those involved – did and still do affect the well-being of the group in question. In the present day, some self-governance arrangements within sovereign countries, such as territorial government in Nunavut, and to a higher degree, Self-Government in Greenland, provide great potential for cultural autonomy. However, assessing cultural autonomy through some indicators becomes crucial for minorities that do not enjoy such large degrees of self-governance.

Cultural autonomy is linked with the notion of cultural self-determination. This concept is drawn mainly from European experiences of accommodating ethnic minorities within nation-state borders, and it has been neither uniform nor easy, as recent studies on cultural autonomy measures within European nation-states have shown (Malloy, 2005). Indigenous peoples within Russia and elsewhere have political institutions recognized, such as the Saami Parliament in Finland. Other measures include a range that may be viewed on a con-



Whitefish drying at a camp near Inuvik, Mackenzie River, Canada.
Photo: Stephanie Irlbacher-Fox

tinuum of efficacy for achieving cultural autonomy goals. These range from the somewhat less institutional approach such as Russian *obshchina*, to the establishment of autonomous districts or republics named for indigenous peoples whose homelands constitute their geographic basis (e.g., Komi, Sakha). These institutions include rights to land use and political organization, since indigenous cultural well-being is understood to rest in part on land-based socioeconomic pursuits.

Generally, the concept of cultural autonomy applies in situations where a state may have one dominant ethnic group and significant minority ethnic populations. Thus the term has a normative political dimension. So, an institution fostering cultural autonomy would not be, for example, a dance troupe or an educational institution. Those institutions foster culture itself. Instead, an institution fostering cultural autonomy would have a mandate that would include representing the collective rights of its members to create cultural and educational organizations in the service of cultural development activities, particularly in cases where the members are part of an ethnic minority. This also implies an obligation on the part of regional and national authorities to recognize and support cultural autonomy efforts.

Thus there are two aspects to this indicator: whether institutions exist for the purposes of

fostering cultural autonomy, and whether Arctic states or their regional governments have policies and/or other supports in place to enable cultural autonomy efforts. Recognizing the shared responsibility of government and ethnic minorities in the pursuit of cultural autonomy is necessary for an adequate understanding of cultural autonomy well-being.

For our purposes, cultural autonomy is understood as *opportunities and resources necessary for a population with a distinct culture to pursue what it deems adequate for its cultural well-being and maintenance of its group identity*. With this understanding in hand, an indicator of cultural autonomy would address two factors, described below.

1) The existence of institutions that are created by ethnic populations and possess the following characteristics:

- State recognition and the reception of funding or other support for its ongoing maintenance
- The aim of fostering the cultural interests and goals of a specific ethnic population (not necessarily “maintenance of tradition”), which may extend to social, political, and economic interests and goals
- Representation of the interests of its members in external relations on local/regional, national, and international levels

These criteria identify the interests of ethnic populations with respect to cultural autonomy. “Interests” is a term that indicates the type of outcome desired by the ethnic group or institution without restricting or predetermining the mechanisms used for ensuring the outcomes or interests are achieved. By representing interests, institutions are able to engage flexibly with, for example, national governments, when determining ways that cultural autonomy may be pursued within the constitutional or legal frameworks of a nation-state. For example, fostering interests culturally may mean the institution can seek participation in government-sponsored cultural programming and/or partner with other ethnic minorities to establish cultural programs to serve their cultural goals. Representing interests of members in external relations would be, for example, an institution such as the Inuit

Tapirit Kanatami in Canada participating in the Inuit Circumpolar Conference, or RAIPON participating in the Arctic Council.

The following are some examples of such institutions:

- Indigenous people’s cultural and political organizations created through land claims in Alaska and Canada (regional or local)
- Fédération Franco-Ténoise (French in northern Canada-regional)
- Obshchinas and indigenous people’s representative organizations in Russia (regional, local)
- Russian law on territories of traditional resource use of indigenous small-numbered peoples (national, regional, local)
- Saami parliaments in northern Europe (regional or national)
- International organizations for ethnic populations divided by state borders (Inuit Circumpolar Council, Arctic Athabaskan Council, Aleut International, Saami Council-International)

2) The existence of government policies and/or other supports at the national or regional level fostering cultural autonomy efforts.

The indicator should apply to all Arctic residents, crossing the indigenous/non-indigenous divide. The appropriate scale of the indicator should be regional and encompass all groups claiming a distinct culture and/or language. When such groups are divided by national or regional borders, the indicator should be differentiated accordingly.

The following are some examples of such government supports:

- Canada’s multiculturalism policy through the Department of Canadian Heritage (national)
- Canada’s two official languages: French and English (national)
- Canada’s comprehensive land claim and self-government policies (national)
- Russian Federation law on obshchinas (national)
- Canada’s Northwest Territories’ 11 official languages: French, English, and all indigenous languages except Michif (regional).

The (Finnish) Saami Act on Cultural Autonomy

Located in Inari, Finland, the Saami Parliament was originally established in 1973 but did not receive official status until more than two decades later, the result of a new section- 51 u (t)73/95-being added to Finland's constitution. A subsection of the changes, the Saami Parliament Act (974/95), officially brought the Saami Parliament into being. Under the Sami Parliament Act, 21 Saami representatives are elected every four years and charged with overseeing various aspects of Saami cultural autonomy. This includes developing legislation, initiating programs, and overseeing how funds directed to Saami people in Finland will be disbursed. Responsibilities include advocating for the rights of Saami with respect to education, land rights, social problems, and health issues. The 1995 constitutional amendments (which came into effect in 1996) respecting cultural autonomy considerably improved the Saami people's potential for language and culture development and recognition. However, implementing programs giving life to the constitutional amendments depends largely on adequate funding and resources. In addition, the amendments expanded the definition of a Saami person, amid fears that such an expansion might increase the potential for Saami assimilation (Finnish Sami Parliament, 1997).

2.2.1 Data Limitations

An indicator on cultural autonomy would require compiling a variety of existing data, which would then be measured by a researcher. Such an indicator would be unique in that it would focus on raw data common to, and publicly available in, all Arctic nations. The indicator could function both quantitatively and qualitatively. For example, questions asked might include the following:

- Does a state have a law recognizing or facilitating the cultural autonomy of different peoples within it, or marginalized peoples within it?
- Is there an implementation policy or set of measures in place that makes the law meaningful?

- Does the state have necessary supports in place for people to access the opportunities for cultural autonomy afforded by the laws?
- Are people taking advantage of these opportunities?

It may also be possible to assemble qualitative aspects of this data, such as annual reports of activities and expenditures. These qualitative aspects are extremely important, as those best positioned to comment on the efficacy of cultural autonomy measures afforded by nation-states are marginalized peoples who may not be in a position to generate data or to criticize state governments. On the other hand, such an indicator could also be narrowed down to a simple determination of whether cultural autonomy



Smoldering ruin of a house in Cherskii, Sakha Republic, Russian Federation, with a portrait of Lenin in the background. Cherskii used to be a prominent Soviet Arctic city servicing the Northern Sea Route through its port facilities at „Green Cape“. The disintegration of the Soviet Union in the early 1990s led to massive out-migration. Photo by Peter Schweitzer, summer 1999.



Judy Lafferty of Radillih
Ko, NWT flat smoking
a moose hide.
Photo: Stephanie
Irlbacher-Fox

legislation or policies are in place and are accessible by Arctic peoples. There seem to be no limitations on the data available for the successful monitoring of this indicator.

2.3 Belonging

The notion of belonging, of feeling comfortable living in one's community and region, is attractive when considering concepts such as human development, living conditions, quality of life, and social well-being. Measuring this aspect on the basis of objective data, such as migrations, cannot reveal the degree of well-being associated with remaining in a community instead of emigrating. Emigration itself may be motivated by a desire to improve one's own or one's family's well-being. As an *emic* notion (i.e., one that focuses on the intrinsic cultural distinctions that are meaningful to the members of a given society) belonging can only be captured through in-depth surveys. Many of the SLiCA

variables could be considered in the construction of an indicator of belonging (see, for example, Tables 49-64 and 75-96 in Poppel et al., 2007). Short of collecting a number of variables, however, it might not be possible to elucidate the degree of well-being associated with staying in a community versus leaving it.

In our age of universal virtual connections, a more fruitful approach may be to focus on the persistence of social networks within communities as well as the extent of "virtual communities" encompassing members living in other places. The importance of family and social networks is a well-recognized attribute of many Arctic societies, one that is considered a foundation of their culture. Belonging in the Arctic refers as much to the surrounding landscape as to the family and social networks that individuals are involved in. These social bonds often are not cut when individuals or households leave a community. In the Arctic, social

scientists have emphasized how such bonds can have economic functions, such as when family members in towns send cash or materials to rural communities in exchange for country food (Fienup-Riordan et al., 2000; Fogel-Chance, 1993; Lee, 2002).

Informal exchanges between households, whether local or not, may in fact constitute a good proxy for the perpetuation of the social bonds favored by many Arctic cultures. Arctic societies are believed to have created an original form of economic organization combining formal income and other forms of activity and exchange; the keepers of official statistics have often been criticized for not taking into account the elements of this informal economy, such as hunting, fishing, gathering, and the associated processes of redistribution (Usher et al., 2003; Usher and Wenzel, 1987; Wolfe and Walker, 1987). It is desirable to investigate the informal economy more routinely to understand the functioning of Arctic economies and to receive an indicator of its sociocultural functioning. To make such an indicator sustainable would probably require local observation networks. Such observation might be facilitated by making it profitable for communities to show decision makers the crucial importance of the local economy and of sharing networks.

2.3.1 Data Limitations

An indicator designed to track belonging could prove problematic without severely narrowing its array of potential measures. As discussed above, the belonging indicator includes areas that are difficult to assess and/or to quantify. In addition, these data are not currently being collected, likely due to their complexity. The data are thus subject to extensive limitations: adequate data are not being collected, standardizing the data across societies and cultures could be difficult, and conceptual aspects of such an indicator have not been standardized within the circumpolar world (at least relative to the measurable dimensions of, say, language or cultural autonomy).

3.0 Selected Indicators of Cultural Well-being for the Arctic

The foregoing discussions have demonstrated that language retention, cultural autonomy, and belonging are important components for an understanding of cultural well-being in the Arctic.

3.1 A Composite Indicator

Table 5.5 illustrates the elements of a composite indicator for cultural vitality. Such a composite index would present the advantage of taking into account developments that affect cultural well-being but that may diverge from each other. For example, language retention in a group may decrease even as the subsistence way of life (including economic, social, and cultural aspects) remains comparatively strong. Likewise, cultural autonomy per se may not provide a sufficient buffer against language erosion or a reduction of subsistence activities due to the encroachment of industry. The weighing of the different parameters of such a composite indicator could be accomplished only meaningfully when applying it through the use of real data, an exercise which is beyond the scope of this chapter.

3.2 Other Indicator Options

The task presented was to find one to three indicators that could be adopted as a measure for the domain of cultural integrity/vitality. The foregoing discussion probes the potentials, values, and drawbacks of selecting each indicator, but three options that meet the eligibility criteria seem to emerge.

As mentioned, the so-called cultural vitality index, a multidimensional composite indicator, best reflects the complexities and dynamics of culture in the circumpolar North. At the same time, we are aware that such a composite indicator poses significant problems of measuring and weighing multiple sub-domains and, thus, might be difficult to implement. Nevertheless, indicators are valuable for their immediacy and accessibility; they are not necessarily meant to provide a larger picture or possess explanatory power for all social phenomena (Bauer, 1966). A composite would provide a sense of the state of things within different dimensions of cult-

Table 5.5: Composite Indicator for Cultural Vitality

Indicator Elements	Indicator
• Do laws and policies exist in a given state or region that recognize institutions that advocate for the cultural autonomy of national minority populations? • Do institutions representing national minority cultures exist? • What is the proportion of such institutions to minority peoples, e.g. are all peoples represented through such organizations? • Are resources available to such institutions? • Are funding policies in place and how well-resourced are they?	Cultural autonomy
• What percentage of a population speaks its ancestral language compared with the population as a whole?	Language retention
• What percentage of people are engaged in recreational or subsistence activities on the land? • What is the relative size of the informal (subsistence-based) sector of the economy?	Belonging

ural vitality/integrity, which policy makers may find of more value as indicators are tracked over time and through various local, national, and international developments. After all, we believe that complexity cannot be expressed through simple measures.

This brings us to our next indicator option, one where data and measurements are readily available. Within the context of the cultural vitality/integrity domain, this is language retention, or language vitality. This option is accepted as valid, readily understood by both policy makers and Arctic populations, and universal both in the circumpolar world and within the various populations constituted by it. All peoples, all cultures, have language. Language usage, rates of retention, and demographics of

language users are the sorts of information that provide a sense of overall cultural integrity/vitality.

The third option would be to combine the stand-alone language retention indicator with other measures. One possibility would be to add “consumption/harvesting of country food” (an indicator used for “material well-being” and “closeness to nature”). This measure is clearly related to cultural vitality, and it would put the results of the language retention indicator into perspective. For example, it might help explain why, in some cases, cultural well-being is not that great despite language retention or, on the contrary, that a particular culture may be thriving despite some language loss. This option might seem like a composite indicator at

“Waiting” – a boat used for whaling sits at the edge of the lead waiting for the animals to pass by; Point Hope, Alaska. Photo by Benjamin Hopson III



first glance, but the idea here is to compare and contrast two indicators instead of creating another composite indicator.

Finally, there are some who would reject the very notion that cultural well-being can be captured by one or more (single or composite) indicators. We acknowledge that such a rejection can be based on good scholarly motives but believe that it is counterproductive politically, since it only reinforces stereotypes about the “softness” of culture. We appreciate that policy and state decision-making often does not have the luxury of declining to act. Likewise, we feel that culture is too important to be left out of the mix of Arctic social indicators.

4.0 Concluding Comments

Whatever indicator is chosen, connections between cultural well-being and other domains must be kept in mind. For example, the notion of cultural autonomy seems to be tied to fate control and should be considered in concert with that group. Likewise, contact with nature – which some consider to be a cultural construct – might contribute to cultural well-being. Also, the relative size of the informal economy might be relevant for cultural well-being, insofar as it serves as a proxy for sharing and social networks. Finally, since the education domain group seems to be putting relatively little emphasis on non-formal modes of transmission of knowledge to the next generation, this dimension of education might fall into the purview of cultural well-being.

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6 Contact with nature

Susan A. Crate, Bruce C. Forbes, Leslie King, and Jack Kruse

1.0 Introduction

Historically, Arctic societies have fed, sheltered, and clothed themselves and maintained their well-being, in large part through a close relationship and interdependence with the natural environment. Arctic human-environment interactions fulfill the physical needs for food and shelter and also ground humans spiritually in their cultural worlds. Generally speaking, Arctic societies have undergone tremendous change in the last century, due mostly to the forces of globalization, resource development, urbanization, and modernity. These changes, in turn, have affected and transformed Arctic human-environment interactions by fragmenting and exploiting lands and ecosystems, redefining rural ways of life through structures such as settlement policies and working-class obligations, and replacing local ways of knowing with mass communication, information, and technology. Despite these changes, most Arctic inhabitants, to a greater or lesser degree, maintain an interrelationship with the natural world based upon their cultural legacy, continued need for food, clothing and shelter, and a strong sense of place and meaning in the Arctic environment. Contact with nature, albeit a somewhat intangible attribute of human development and therefore difficult to measure, is nonetheless central to the legacy of and contemporary state of well-being in Arctic societies.

1.1 Concept of Contact with Nature

A close connection to and need for contact with nature is not, of course, confined to the Arctic.

Human-environment interrelationships are central to global ecosystem health and human well-being. Key literature of the contemporary environmental movement in the West emphasizes the universal need for, on both physical and spiritual levels, humanity's continued contact and interdependence with the natural world (Leopold, 1948; Muir and White, 2006; Brody, 1997; Lopez, 2004). More recently, Louv (2005) has labeled our contemporary Western societies' disconnect with nature as a "nature deficit disorder," and has made this call to action: "Healing the broken bond between our young and nature is in our self-interest, not only because aesthetics or justice demand it, but also because our mental, physical, and spiritual health depend upon it." However, this broad expanse of literature is lacking in specific definitions of exactly what the contact with nature interrelationship looks like that would lead to measureable variables. We know that Arctic societies demonstrate a strong interdependence with the natural world for their identity and subsistence needs. Therefore, one logical path toward developing indicators for contact with nature would be by finding ways to measure participation in various livelihood activities. This is the path we paid special attention to and describe here in detail.

1.2 Overview of Contact with Nature in the Arctic

The *Arctic Human Development Report* (AHDR) identifies "living close to nature" as one of the three dimensions of human development that

Illustration of reindeer carved into antler bone from central Europe circa 12,000 B.C. Reproduced with permission from Rosengarten-museum, Konstanz, Germany.



Arctic residents perceive as essential to their well-being above and beyond the three United Nations Human Development Indicators. But what exactly does living close to nature or, as termed for our purposes, “contact with nature” mean as a measurable quality in a community and/or a region? The AHDR does not provide a set definition for the concept but does emphasize the important place of nature in human Arctic relations, characterizing Arctic societies as “place-based systems” that “feature human adaptations...closely tied to local environments” (AHDR 2004:241). Further, the report implies the importance to human well-being of contact with nature by saying that “a failure to stay close to nature results in a loss of roots and various forms of alienation from the natural world” (AHDR, 2004). Beyond that reference, the AHDR gives little guidance for the development of an indicator for contact with nature.

For Arctic societies, indicators of human development must be unique to the Arctic but also address the well-being of both indigenous and non-indigenous people and be appropriate to all communities and countries in the circumpolar North. For our purposes here, “indigenous” refers to those who inhabited an area prior to colonization or the establishment of state boundaries. The Arctic is home to a diversity of indigenous groups. Non-indigenous inhabitants of the Arctic are either 1) longtime residents whose ancestors settled during the

colonial process, or 2) relative newcomers from more southern climes who have either moved to the North to take a job and have stayed, or who have come as temporary residents to take advantage of high-paying jobs. The latter example pertains especially in the Russian context and the post-World War II Soviet efforts to develop the military-industrial presence across the country.

Whether northern residents are indigenous or non-indigenous, the majority participate in some or many activities in nature. Residents of urban and rural areas alike engage in outdoor activities for both utilitarian purposes, to procure wild and domestic food sources, and for recreational purposes. Although Arctic indigenous inhabitants generally depend on their natural environment for more of their food than do non-indigenous inhabitants, there is nevertheless a strong tradition across all Arctic communities to gather berries, fish, garden, and engage in other food-procuring activities such as hunting and herding.

The literature provides little guidance for indicator development in the area of contact with nature. Although community, sustainability, and conservation indicators are increasingly common, few are relevant to Arctic societies and almost none are relevant to contact with nature. There are, however, some exceptions. One is the Survey of Living Conditions in the Arctic (SLiCA), perhaps the best source for indicators with the potential to measure contact

Traditional Foods in the Arctic

From prehistoric and historic through to modern times, the procurement and slaughter of wild game and the management of domestic animals (e.g., reindeer, horses) has always been about much more than just food. In addition to basic sustenance, interaction with animals provides the basis for clothing, shelter, tools, art, language, education, calendar, status, spiritual fulfillment and, not least, the maintenance of intra- and interhousehold sociocultural relations through formal and informal codes of sharing and reciprocity (Nelson, 1969; Beach, 1981; Wenzel, 1991, 2005; Crate, 2006a; Stammler, 2005; Vitebsky, 2005; Müller-Wille, et al., 2006). In other words, interaction with animals is a key element of the social fabric of local communities throughout the Arctic.

Some people outside the Arctic may believe that hunting and herding represent dying ways of life. However, examples of consumption of wild foods and youth retention indicate otherwise. For example, in the early 1980s, ringed seal provided nearly two-thirds of the edible biomass entering the Inuit hamlet of Kangiqtugaapik, Nunavut, formerly known as Clyde River. Ringed seal figure prominently in the diet in all seasons, falling below 50% only in summer when ice is out (Wenzel, 1991). In 1984, even when sealskins had no exchange value because of the EEC ban on them, harvesting was demonstrably important to the Kangiqtugaapik economy. Since 1983, when the EEC ban began to have a strong negative effect on all forms of hunting, the total harvest of country foods has actually increased some 15% to 20% (Wenzel, 1991). On the other hand, the human population of Kangiqtugaapik has increased some 250% to 300% during the same period. Conservative estimates made with data from the recent Nunavut Wildlife Harvest Study (Priest and Usher, 2004) reveal that total harvest of the four staple species (ringed seal, caribou, narwhal, and arctic char) provided each of approximately 125 households with between 850 kg and 900 kg of edible foods in the late 1990s and early 2000s. Compared with a generation ago, the total harvest for Kangiqtugaapik is provided by relatively fewer hunters, highlighting the importance of sharing. Even though the increased harvest has not kept pace with population growth, it is difficult to argue that hunting and country food consumption are somehow disappearing. On the contrary, sharing and consumption of wild foods are seen as important components of modern Inuit identity (Wenzel, 1991, 2005).



Children fishing through cracks in the ice near Kangiqtugaapik, Nunavut, Canada.

Photo by B.C. Forbes

with nature. However, SLiCA results are limited to the Inuit in northern Canada, northern Alaska, and Greenland, and the indigenous peoples of Chukotka, Russia. Despite its geographical limits, the three SLiCA Ties to Nature tables (Tables 13, 17, and 31) appear to be relevant to the contact with nature domain and could potentially provide data (Kruse et al., 2007; Kruse et al., 2008).

Another relevant source of existing Arctic indicators is the Inuvialuit Regional Corporation's socioeconomic indicators set out in the Inuvialuit Final Agreement of 1984. The three key goals of that agreement are to 1) preserve Inuvialuit cultural identity and values; 2) enable equal and meaningful participation in Canadian society; and 3) protect and preserve Arctic wildlife, environment, and biological productivity.

The Inuvialuit socioeconomic indicators were intended to track and measure progress toward those goals. Several of those indicators have potential as indicators for the contact with nature domain and may also provide a source of data for other ASI domains. In pursuing the goal of "a diverse economy" for instance, the first three indicators are potentially useful for the contact with nature domain:

- percentage of population who harvest for commercial use
- percentage of population who sell fish meat, carvings, etc.
- percentage of population who bought and/or sold country food

In addition, three other indicators may be relevant to the health domain:

- percentage of households where half or more of the meat and fish eaten in the last year was country food
- percentage of children consuming wild meat three or more days per week
- percentage of the population very or somewhat satisfied with the availability of country food to their household

Lastly, the Community Well-being Index, a composite index of the well-being of Inuit communities in Canada developed by Indian and Northern Affairs Canada (INAC), combines four measures: income, housing, education, and

labor market. However, it has little to say about contact with nature (O'Sullivan and McHardy, 2004; McHardy and O'Sullivan, 2004; Cooke et al., 2004).

Beyond specific existing projects that involve some level of indicators, other available data relevant to contact with nature are those pertaining to the harvesting and consumption of country food. One example, albeit primarily non-Arctic but nonetheless methodologically interesting, includes corroborating data from coastal Canada where country food consists of primarily mainly fish and seafood. In recent years studies have shown the decreasing or increasing consumption of seafood, the reasons for these changes, and the proportion of wild seafood in diets. A number of studies indicate that average Canadian consumption of traditional food is 4.5 kg per capita annually (Conacher, 1993) whereas Mohawk consumption is 8.4 kg per capita annually (Chan, 1998). Five Vancouver Island First Nations consume 60.5 kg per person per year (Ross and Child, 2008) and Quebec Inuit consume 109.5 kg per person per year (Dewailly et al., 1993). The Ross Vancouver Island Study reports that inhabitants procure their seafood via a mixture of traditional harvesting (89%), supermarkets (8%), and restaurants (3%). Reasons for declining consumption are given as "abundance has changed" (38%), "way of life has changed" (28%), "pollution concerns" (25%), "lack of time," "change of tastes," and "government regulation" (Ross and Child, 2008). This study also reveals that consumption of traditional food is highest in the older age groups, indicating a shift away from traditional food consumption in the young. This trend is a source of great concern to First Nations communities and individuals who are quick to point out that eating traditional food is central to their culture, spirituality, health, and well-being.

One major constraint to measuring contact with nature is the lack of current data. Recent data, although patchy both temporally and spatially, do indicate a strong connection between Arctic inhabitants and local resources. Clearly the mandate to develop indicators for contact with nature is extremely challenging. The task involves the development of a baseline, a flexible measure that could apply in dif-

Youth Retention

According to Turi (2002), in general there are no recruitment problems in reindeer herding except in certain taiga regions of Russia. There is general agreement among reindeer herders, scientists, and local authorities that reindeer husbandry cannot be learned in institutes or schools. To be a good herder, one must grow up in a reindeer-herding family. For the sake of recruitment, it is important that the child spend his or her first years before school in a brigade (Ulvevadet and Klovov, 2004). In order to get a school education, children from herding families can only stay with their parents for a few months a year during the summer holidays. The school administration accommodates the wishes of children who want to spend more time in the camp with their parents and learn more about reindeer herding and husbandry. These students are allowed to leave before the official end of the school year, and sometimes they arrive after it has begun. In this way the school children can stay in the herding camps up to five months a year (Ulvevadet and Klovov, 2004).

Research on the structure and size of reindeer herding families in YNAO, Taimyr, and Chukotka has shown that compared with families that are settled, nomadic families have better demographic indices for characteristics such as the average size of the family, average number of children per family, and natural increase (birth rate and death rate). For example, the average size of a nomadic family in Chukotka was 3.9 persons versus 2.8 in a settled family. In YNAO the corresponding ratio was 5.1 to 4.0, and in Taimyr it was 5.5 to 3.5. Nomadic families usually consist of married couples with children, while populations in permanent settlements often consist of a mix of families and divorced and unwed women with children. This shows that the maintenance of nomadic reindeer herding is an important demographic factor that contributes to the maintenance of indigenous peoples, although herder families are deprived of many material comforts and conveniences. It is important to emphasize that the last population census (2002) showed that the Nenets, with close relations to nomadic reindeer herding, had the largest population growth among all of the northern peoples of Russia (Ulvevadet and Klovov, 2004).

Most schools in the Baffin region of Nunavut, Canada, now run through Grade 12. Upon graduation, several students go to Iqaluit for training at Arctic College. According to Wenzel (Dept. of Geog., McGill, pers. comm., 2007.), two former Kangiqtugaapik residents have passed the college's law program. But if students want a job with the Government of Nunavut, the territory's largest employer, they must relocate to Iqaluit or one of the places to which departments have been decentralized (around northern Baffin these are Pond Inlet and Igloodik). As a result, Kangiqtugaapik underwent a slight population loss in 2006.

In rural Viliui Sakha villages of northeastern Siberia, Russia, post-Soviet demographic trends show youth relocating to regional centers or to the capital city, Yakutsk. Although it is commonly thought that youth leave because they prefer the more cosmopolitan lifestyle in the centers, recent research reveals that most desire to live in their home villages, raise their own food, and be close to their kin, but they are forced to leave because the rural areas lack jobs opportunities (Crate, 2006b; 2006c).

Nenets boy, with reindeer herding dog on tundra, holding boxes of tea and a biscuit. Yamal Peninsula on the summer pastures of Yarsalinski sovkhov, near Bovanenkovo Gas Field, July 2005. Name of boy unknown.
Photo by B.C. Forbes.



ferent regions such as Alaska, Iceland, and Russia, access to current and consistent data in all countries and regions, and means to address data gaps, among other issues.

2.0 Possible Indicators of Contact with Nature

The first step in identifying indicators for contact with nature is to develop a set of criteria that potential indicators would have to fulfill. The indicators need to be few in number and reflect key aspects of Arctic human development in the contact with nature domain. They need to be tractable in terms of measurement and be either monitored at a reasonable cost or have data readily available from other sources. They also need to be policy relevant, generalizable, stable, easy to measure, and suitable for longitudinal analysis. Additionally, indicators need to be relevant across the circumpolar Arctic to both Aboriginal and non-Aboriginal peoples and communities, and to both women and men.

To begin the process of identifying and evaluating indicators, we first free-listed potential indicators, subjected each to a test of several criteria outlined in an evaluation matrix, and then, based upon that test, chose the 10 most suitable:

- Time on the land
- Number of traditional activities
- Number of people or households engaged in the traditional economy
- Harvest (kilograms per annum per capita)
- Consumption of country foods (kilograms per annum per capita)
- Income spent on nature-related activities
- Local control of resources
- Proportion of economy dependent on natural resources
- Youth in traditional subsistence activities
- Demography (youth retention)

We further subjected these 10 indicators to the following criteria: data availability, feasibility of measurement, clear meaning, affordability, robustness over time, reporting level, and applicability to indigenous and non-indigenous peoples. Three of the indicators proved robust for these criteria:

- Harvest (kilograms per annum per capita)
- Consumption of country foods (kilograms per annum per capita)
- Number of people or households engaged in the traditional economy

The main hurdle for all three indicators is data availability. While data are available for most of the circumpolar North, Russia is highly problematic. There are statistical data for these three variables through the end of the Soviet period, but all such data remain questionable due to inconsistency and rounding up to “meet the plan.” Furthermore, there exists a data gap during the transition period after the fall of the Soviet Union, and what data exist are patchy. For example, the government did count wild reindeer hunted and also kept numbers of domestic reindeer in households—so there are numbers of households involved in the economy. Another nuance is that in the Arctic north of Russia, data are more available for indigenous communities because they are more routinely collected. Some data are available at republic and oblast levels, but may be expensive to obtain – even more expensive if you’re a “white” researcher from the West. Being in business to sell data is widespread in Russia.

There are also problems for tracking household or individual harvest and consumption patterns in Fennoscandia. For households that are involved in reindeer herding, statistics are not kept on the number of animals or amount of meat retained for personal consumption. In Fennoscandia and Russia, both non-indigenous and indigenous households are often heavily engaged in the traditional economy through activities such as fishing and berry and mushroom picking. Since some products, such as fish and cloudberries, are sold commercially, there may well be excellent statistics for annual harvest, yet these will not reflect personal or household consumption levels. That being said, it should be noted that SLiCA offers a promising source of data for two of the three potential indicators (participation in traditional economy and consumption of country foods).

It is also important to note that in addition to the issue of data availability, all measures of contact with nature involving harvest and resource use pose a special challenge for inter-

pretation and therefore demand some triangulation of the data with other domains. Human development is traditionally measured on a one-dimensional scale: the higher the observed value on a human development scale, the higher the level of human development. In the case of contact with nature, however, we must accept the fact that more is not always better. Consider the case of a community with a single employer who decides to leave. Jobs are lost. Cash is scarce. People choose to hunt and fish more. Contact with nature increases. Consider the same community, only this time a second employer arrives with a policy of granting leave for hunting and fishing. Cash incomes increase, and the subsistence leave policy is successful. People choose to hunt and fish more. Contact with nature increases. Thus, we cannot understand whether an increase in our measures of contact with nature is positive or negative with respect to human development by only examining the contact with nature measure itself. We can, however, properly interpret its meaning if we corroborate contact with nature measures with those of material success.

2.1 Indicator: Participation in the Traditional Economy

2.1.1 Participation in Traditional/Outdoor Activities

Although the indicator of participation in traditional/outdoor activities appears at first to be an excellent and tangible indicator of contact with nature, it presents two challenges: poor availability of data and difficulty in translating measures across the diversity of Arctic populations. For example, consider the diversity and range of activities possible across the Arctic, from hunting, fishing, and foraging to bird watching, hiking, and dog sledding – and the list goes on. Such a slate of activities for different populations and regions is found in SLiCA data, but similar data would need to be collected for the non-SLiCA regions. Some of these activities are more relevant to indigenous than non-indigenous populations and some are pursued predominantly by either women or men. In sum, ensuring that the diversity of activities would be inclusive of all groups would make this indicator too complex and would

necessitate an enormous and unwieldy data-gathering effort.

2.1.2 Time on the Land

Perhaps there would be a way to solve the data problem of the participation in the traditional economy indicator by focusing on the quantitative measure of time spent in activities or “time on the land.” Many rural Arctic populations depend on subsistence resources for some percentage of their household food. Subsistence-dependent Arctic inhabitants, by design, need to spend significant time in nature engaged in harvesting activities (Berkes and Jolly, 2001). The more a household depends on subsistence resources, the more time its members need to spend on the land.

The rationale for considering time on the land as an indicator for the contact with nature domain is that it represents time away from a household context, spent in nature and involved in subsistence and/or other outdoor activities. It is important to note that some research has shown Arctic inhabitants are spending less time on the land and in contact with nature, and that this trend is in turn affecting other aspects of well-being. As Young (1996) succinctly states, “Spending less time on the land has been shown to be a direct correlate of obesity in Arctic populations, suggesting that along with less time on the land, Arctic populations are also engaging in less healthy diet practices. Again, this is a reminder of the importance to corroborate indicators to gain the most robust measures of well-being.

Before considering the applicability of time on the land as an indicator, we first provide a few “close-ups” of how time on the land is, in fact, key to human well-being in the Arctic.

Close-up: reindeer herding

Among nomadic tundra Nenets herders inhabiting the Yamal National Autonomous Okrug (YNAO) of northwestern Russia’s tundra, reindeer are intensively managed 24 hours a day, 365 days a year, by whole families and across generations (Krupnik, 1993; Stammeler, 2005). Among intensive herding populations, the herd size of individual households varies greatly (Stammeler, 2005). Generally, the further north a herder lives, the bigger the herd. In northern-

Nenets women
corralling reindeer
outside chums at winter
pastures near Nadym,
YNAO. Notice reindeer
skin coats, boots and
chum covering.
Photo by B.C. Forbes



Reindeer Herding in the Arctic

There are more than three million semi-domesticated reindeer across northern Eurasia of which 700,000 are in the Saami area (Baer, 2002). Reindeer herding is a small activity in terms of its employment and economic impact. There are fewer than 100,000 people engaged in it, including elderly people and children. In other words, reindeer herders make up less than 1% of the total human population of the Arctic. On the other hand, while the rest of the total Arctic human population is declining in most areas, the number of reindeer herders is actually growing (Turi, 2002). It is estimated that, including consumption of meat for personal use, the total meat production by reindeer herding is 18,000 tons per year with an approximate commercial value of USD \$50 million to \$52 million. The Nordic quota constitutes more than 50% of this amount. This roughly equates with the combined production capacity of three to four medium-size fish farms (Turi, 2002). Reindeer herding is, therefore, significant for thinly populated northern regions but fairly insignificant economically compared with the main competing interests within modern Fennoscandia such as the mining, hydro power, timber, and tourist industries (Beach, 1981; Turi, 2002; Forbes et al., 2006).

Reindeer management has brand value in modern Finland, meaning marketable value over and above that of meat. Some herders have created niche markets for custom-made meat products, such as high-end restaurants in Helsinki. After Finland joined the EU, the much-criticized centralized slaughterhouses had an unintended positive side effect. Reindeer meat slaughtered in these slaughterhouses and processed in meat factories is not considered good enough for private buyers. Demand for traditionally slaughtered reindeer that is cut specifically for household use is higher than some herders can produce (Hukkinen et al., 2006).

On the Yamal and Kola Peninsulas in Arctic Russia, annual per capita consumption of reindeer meat is extremely high (ca. 200 kg to 225 kg) (Konstantinov, 2005; Stammeler, 2005). Although figures for harvest and consumption were not available, we know that herders also spend a great deal of effort procuring fish year-round, especially in summer when they prefer not to slaughter their reindeer to avoid wasting the molting fur. On the Yamal Peninsula, large families are the norm among nomadic Nenets, and youth retention appears to be high (Ulvevadet and Klovov, 2004). Along with the steadily increasing reindeer population, these data indicate that reindeer herding is a vibrant livelihood, albeit one faced with threats from accelerating oil and gas development (Stammeler, 2005; Forbes et al. 2009 in press).

most Yamal, a herd of 500 is seen as sufficient for the subsistence needs of a household, whereas in the central and southern parts, a herd of 150 to 300 is adequate. Among the mountain herders in the southwest of YNAO, a private herder with 100 animals is thought to be well-off. The absence of firewood in the far north and the need to transport wood over long distances considerably increases the need for transport animals. Monthly reindeer meat consumption among tundra Nenets is fairly consistent outside of summer, when the staple food becomes freshwater fish to avoid slaughtering molting animals and in doing so wasting the valuable fur, which can be used for many purposes (clothing, bedding, tent covering, etc.). According to Stammler (Univ. of Lapland, pers. comm., 2007), an average household may slaughter an adult male or female animal every 10 days for consumptive use, including food for dogs kept for managing the herd. Nenets reindeer are the smallest in size among the four domestic breeds or ecotypes in Russia. The average weight for male after slaughter is 52 kg to 58 kg (Stammler, 2005). Across YNAO in 1998, there were 2,618 nuclear family-based household units managing nearly 600,000 reindeer (WRH, 1999). As of 2007 the number of herded animals was over 630,000 (UralPolit, 2008).

Whereas the actual number of deer owned by a household is based on the people's need for subsistence and on their herding skills, the size of the grazing herd is a management decision. Baskin (1991) has established that the minimum herd size that can be managed effectively is 35 animals, the most efficient herd sizes is between 100 and 300 animals, and that a herd of more than 3,000 becomes mostly unmanageable.

In addition to matters of basic management, herd size must be considered with regard to a wide array of different factors, such as husbandry form (e.g., intensive versus extensive; see Ingold, 1980), security, workforce, and wealth storage, all of which are interdependent (Beach, 1981). Beach (1981) notes that a big herd can supply a herding family with enough food in the way of meat without suffering a steady decline in numbers. All slaughtered reindeer will be replaced in the course of reproduction, a resource not available to the small herd-

er, who would consume more meat per year than the herd could reproduce. In earlier times, the herder would have been forced into milking husbandry. Thus, for big herders, extensiveness and meat consumption traditionally went together at the other end of a gradient from small herding, intensiveness, and milking, which formed a unit (Beach, 1981).

Since the transition from traditional Saami herding to the modern mixed economy, most small herders in Fennoscandia must now supplement their income from other sources to maintain their herds and their households above the poverty line or subsistence minimum (Beach, 1981; Ulvevadet and Klovov, 2004). However, as it goes with hunting in a mixed economy (Wenzel, 1991), while alternative income may help one to remain in herding, any part-time or seasonal supportive work necessarily takes time away from the active herding job (Beach, 1981).

Müller-Wille et al. (2006) explore the transition from hunting to herding in the Saami region of Fennoscandia during the period ca. 1400–1700. In the newly emergent economy, the reindeer-herding Saami had the most secure social system among all the Saami subgroups as well as the colonizing settlers. Their food supply exceeded their own needs, and poorer

About Much More Than Just Food

Of course, the procurement and slaughter of wild game and the management of domestic animals (e.g. reindeer, horse, cattle) is about much more than just food, from prehistoric and historic through to modern times. In addition to basic sustenance, interaction with animals provides the basis for clothing, shelter, tools, art, language, education, calendar, spiritual fulfillment and, not least, the maintenance of intra- and inter-household socio-cultural relations though formal and informal codes of sharing and reciprocity (Nelson 1969; Beach 1981; Wenzel 1991, 2005; Stammler 2005; Vitebsky 2005; Müller-Wille et al. 2006). In other words, interaction with animals is a key element of the social fabric of local communities throughout the Arctic.

members were provided with reindeer meat for survival. However, Krupnik (1993) argues that widespread intensive domestication in northern Russia after about 1600 was driven not by a shortage of food but by the limited supply of reindeer skins for clothing, shoes, winter tent coverings, and other household items necessary for surviving in such a cold climate.

Close-up: hunting

After eight to 10 hours of active breathing-hole seal hunting in the eastern Canadian Arctic, hunters begin the one- to two-hour trip home, hopefully with at least one seal lashed to each sled (Wenzel, 1991). One out of every five to six waits at a breathing hole in a day is likely to yield a seal. The 30 kg of meat and edible organs provided by one adult seal can energetically sustain one adult hunter for six full days. Longer winter journeys for caribou or polar bear are made by parties of up to five hunters and carry enough fuel and equipment to be self-sufficient for a month (Wenzel, 1991).

Factors such as distance necessary to travel to find a species and the return that can be expected relative to the effort invested must be considered. Each hunt, therefore, involves an elaborate calculation by hunters of yields and how alternatively to deploy their time, energy, and material resources (Wenzel, 1991).

In 1971, among a team of four hunters from Clyde River (Kangiqtugaapik), Baffin Island, during a four-week period of winter sealing, hunting was done on 21 days (452 hunting hours) and a total of 34 ringed seals were captured. Hunters spent 204 hours actually hunting, another 160 hours repairing and manufacturing equipment, and 88 hours traveling to and from the ice. They were rarely absent from the community overnight and did all of their equipment repair and manufacture in the community (Wenzel, 1991).

In the contemporary context, winter sealing among Kangiqtugaapik Inuit is still mostly done on day trips, but longer distance hunting consumes at least weekends. The coastal area around modern Kangiqtugaapik is dotted with cabins, so being out is more comfortable than it used to be. The longest trips are for summer caribou and take a minimum of four to five days. There are still some hunters who are out

probably 200 days each year, but they are rare as money for equipment and fuel is always an issue. Wenzel believes that an average of 100 days out per adult male is probably a reasonable guess since his own data are biased toward hunters who are not restricted by, for example, employment during weekdays (Wenzel, Dept. of Geog., McGill, pers. comm., 2007).

According to Nelson (1969) northwest Alaskan “Eskimos are very particular about traveling when it is light outside, because they regard night travel as highly inadvisable. They always plan to travel so they camp or be home well before dark.” Hunters dictate their activities mostly according to the presence of game or the distance they have traveled during the day. Generally, hunters try to leave the village sometime in the morning and return by midnight. But nothing actually regulates when they will return except hunger or the urge to go home.

Ringed seal pups are a highly desired food and Kangiqtugaapik hunters spend considerable time searching for dens during the three- to four-week period from mid-April to mid-May when denning occurs. It is surprising how much hunting effort is spent: approximately five hours per pup with five attempts per successful capture (Wenzel, 1991). After the denning period ends in spring, both adults and pups can be hunted by rifle from a camouflaged snowmobile. This method means approaching from downwind and each stalk takes only about five minutes, so many more seals can be stalked. It is difficult to estimate the time and effort expended in the various types of spring sealing, as hunts may last up to 24 hours and are often combined with wider travel (Wenzel, 1991).

At Point Hope, Alaska, a single hunter may kill 200 ringed seals and a few bearded seals in a single winter. A crew of hunters at Wainwright, Alaska, can sometimes take 20 seals in a summer's day from the ice edge. Ice-edge sealing can provide a hunter with 1,000 pounds of game a day, even more on occasion. A single bearded seal may weigh that much alone. Under normal conditions during the winter, a hunter, if proficient, brings home one to three seals with each trip out. In the mid-1960s, only 200 or 300 seals were killed in years when caribou were abundant, more when there was not

enough of this preferred meat or when few walrus were taken (Nelson, 1969).

Considering time on the land

Although the indicator of time on the land, not unlike the indicator of participation in traditional/outdoor activities, may at first glance seem ideal, it too has irreconcilable issues. First, not all subsistence activities require the same time on the land (or sea) input in relation to energy/kCal return. Human populations use wild resources that are available within their ecosystem, and so we see herders, hunters, and fishers in inland areas and fishers/sea mammal hunters along the coasts. Similarly, some subsistence activities are located fully on the land (e.g., fish camps, bear hunts, Sakha horse breeding), others only require partial time on the land (e.g., cattle and some reindeer production), and some, no time on the land (e.g., gardening). Similarly, some subsistence requires a household to live close to full-time on the land (e.g., reindeer/caribou herding). In short, the diversity of time required for various subsistence activities, whether they are seasonal, daily, or one-time events, and whether they are located adjacent to a household or away, make developing and using this indicator problematic.

A second problem is deciding on consistent measures for this indicator. Are we talking about number of minutes, hours, days, weeks, or months per year? Do we measure overnights differently than returning home each night? Exactly what of the time do we count? If resources are far away, do we count travel time to those resources or just the time spent in the subsistence or other activity? These issues of time could be overcome by developing case-by-case or subsistence activity-by-subsistence activity average time input amounts. However, this would be a grandiose undertaking, considering the diversity of socioeconomic, political, and environmental contexts that the various Arctic populations live and practice.

A third problem with time on the land as an indicator is lack of data. To date there is only anecdotal evidence available and only in several (but not all) Arctic regions. Gathering data would require asking people in an extensive circumpolar survey, the likes of SLiCA, which is not possible, given the scope, time, and re-

sources needed. There may be some data from which time on the land could be extrapolated, as in Norway where there are data in municipalities on the number of licenses issued for fishing with skidoos. In that context, it is clear that Saami municipalities give more licenses for skidoos than other Norwegian municipalities. But again, extrapolating this data and comparing them across circumpolar countries is prohibitive.

A fourth issue is the gender bias that time on the land would introduce. In Arctic societies there is a tendency for women to be settled in villages and men to go out on the land. This could be resolved by developing different measures for men and women, but doing so would further complicate the process.

Lastly, the urban-rural difference would also be problematic. In urban settings individuals and/or households either make a complete summer exodus to the rural areas to participate in subsistence and other outdoor activities or reside part- or full-time at a *dacha* to grow gardens, forage, and perform other activities, sometimes while maintaining daily employment. This diversity of contacts makes time on the land an unmanageable indicator for contact with nature.

Gardening, especially for such staple crops as potatoes shown here, represents one of the many forms of 'time on the land' for Sakha, native horse and cattle breeders of northeastern Siberia, Russia. July 2004.

Photo by S.A. Crate.



In most Arctic societies, men spend more time on the land hunting, fishing, and herding than their female counterparts, with the latter more often staying home to attend to the subsistence activities there. Here pictured is a Viliui Sakha grandmother cleaning the ducks that her sons brought home with her granddaughter looking on and learning her future role. Pictured Matryona Yegorova and granddaughter Kathryn Yegorov-Crate, Elgeei village, April 2000. Photo by S.A. Crate.

2.2 Indicators: Consumption of Country Food and Harvest

There is a wide range of wildlife and plant species in the Arctic used for food, especially by indigenous populations but also by non-indigenous residents (Crate, 2006a; 2008b; Forbes and Kofinas, 2000; Klein, 2005). Dietary and cultural changes in the last century have decreased the proportion of wild food that Arctic communities consume. Both the increased access to market food being available stores and a trend toward modernity, with youth aspiring to higher education and career paths outside their home villages, have contributed to a decrease of wild food harvesting activities in many communities. Nevertheless, wild foods are valued for their superior taste and nutritional qualities and for their connections to cultural identity.

Indigenous populations of Canada and Alaska refer to their wild foods as “country foods,” while other Arctic inhabitants refer to “traditional foods.” For our purposes, it is important to expand that understanding to include domesticates, both animals (reindeer, cattle, horses, etc.) and plants (garden and field), considering that again, these sources are produced on a small scale, subsistence and/or limited-market level in a human-environment context similar to wild species.

Despite the general tendency for Arctic residents to consume less country food, there are some anomalies. Census-type surveys of Inuvialuit harvesters conducted in the 1960s and 1970s, and then again in the 1990s, show that the geographic extent of harvesting over that time period stayed about the same, but the ratio of country foods from marine and terrestrial sources shifted, showing a reliance more on the latter. Despite the change in sources of country food, the central place of country food in the Inuvialuit household diet remained unchanged (Usher, 2002). Parallel observations were made in the eastern Canadian Arctic as detailed by Wenzel (1991) and Priest and Usher (2004).

Close-up: Viliui Sakha and other case studies

In the post-Soviet context, country foods became highly desired for reasons of economics and cultural identity. With high unemployment, households turned to country foods to

feed themselves. And in the case of the Viliui Sakha, native horse and cattle breeders of north-eastern Siberia, country foods represented what it meant to be “Sakha” in a post-Soviet ethnic revival (Crate, 2006a; 2008a). Village-level data show an overall increase in country food consumption since the fall of the USSR. These data also reveal great disparity among households, with some consuming close to 75% country food and other consuming none. Such disparity can be explained in various ways. Households not consuming country foods tend to be made up of single mothers with few, if any, kin relations in the immediate or adjacent villages (which limits their pooling of the needed resources of land, labor, and animals) and with substantial subsidies to allow for reliance on store-bought foods. Households consuming a majority of country foods tend to have ample resources (land, labor, animals, and tools) and the necessary knowledge base to produce country foods. To the extent that country food production requires intimate human-environment interaction, it can be used as an indicator of contact with and closeness to nature.

The importance of *kehii*, or house gift, to Viliui Sakha, illustrates beautifully one unexpected place that country foods can play (Crate, 2003). *Kehii* is considered a fundamental part of Sakha social interaction. Most often it is given by guests when they are staying with a household, but it can also be given to the guests by the host. Country food is most often given, and its rareness increases the value of the gift. An especially prized and rare *kehii* is wild strawberry jam because the berries are only slightly larger than a pinhead and grow in a sparse ground cover plant that is difficult to find. More common examples of a *kehii* include a jar of crème fraîche, a portion of blood sausage (either cow or horse), and wild-caught fish or meat, usually moose or bear. *Kehii* symbolizes the bond between guest and host. It also speaks to the level of country food the gift giver's household accesses and its associated contact with nature.

Kehii also plays a central role in Viliui Sakha rural-urban etiquette. As in other Arctic contexts (Chan and Kuhnlein, 2005) indigenous communities closer to urban centers tend to eat less country food because they have greater ac-

cess to store-bought food, employment rates are higher and therefore there are greater monetary resources to purchase food, and there is less access to and time for country food harvesting. This does not mean that urbanites do not consume country food. In fact, it is common to visit a Sakha household in the capital city, Yakutsk, and find wild strawberry jam, crème fraîche, and homegrown meats in the larder. The source of country food in urban contexts is largely based upon kin relations in home villages. Often city dwellers spend their summers in the heavy labor of hay cutting for winter forage and receive in return their full year's supply of country food including cow, horse, and pig meats and organs; wild berry preserves; and milk products, including frozen milk, all of which is sent into the city on cargo trucks during the winter. In addition to or in the absence of such kin connections in the country, Sakha urbanites often have a dacha just outside of the city where they spend most of the summer, as their work permits, to grow a large portion of their vegetable needs, forage as they can, and "have contact with nature."

Other studies also suggest the role of country foods in bridging the urban-rural divide and in maintaining cultural identity. For example, the only ethnic and cultural distinctions between those urban Inuit living in northern Canada and those who have moved south to live in Montreal is the sharing of country food (brought to the city from the North) and the speaking of their native Inuktitut (Kishigami, 2002). The same study found that urban Inuit who intermarry soon lose their taste for country foods.

In some cases, studies on the urban-rural dynamic underscore the central role of country food for native urbanites and the country-specific politics involved. In an analysis of how urban native and non-native residents would be affected by the rural-residence option, Lee (2002) documented how urban Alaskan Yup'ik women exchange their city's riches, in this case day-old doughnuts with country foods including duck, caribou ribs, seal meat and skin, tom cod, and salmon berries. Greenland's Home Rule government has been active in promoting the marketing of country foods. Historically Greenlanders earning wages have bought country foods from Greenlandic hunters. Today this



continues in local *kalaalimineerniarfik* (place where Greenlandic foods are sold). The government today promotes the use of nutritious and culturally valued foods to further their goals of sustainable development and to bolster rural economies (Marquardt and Caulfield, 1996).

Dietary differences between northerners and "outsiders" persist today, even among groups that are considered highly acculturated and have long ago been brought into a cash economy:

An Eskimo once told me that his people simply could not live on a steady diet of white man's food. At first glance it seemed he might have made this statement only to support his wish to hunt, even though he was earning a steady income. But on second thought, the overwhelming truth of his statement is readily apparent if we simply reverse the roles, placing the outsider in a position of having to live entirely on the Aboriginal Eskimo diet. It would be very difficult, as I learned from personal experience and observation of others, for the white man to make such a shift in his own diet. And it is at least as difficult for the Eskimo to live on the white man's food. (Nelson, 1969).

Northwest Alaskan Eskimos believe that having good food, especially when camping, is essential if they are to work at full capacity and keep themselves fortified against the cold (Nelson, 1969). Nelson (1983) provides a tabulation of "uses for selected major species," which includes moose, caribou, and black and

Pictured here is a common sight when entering a rural Viliui Sakha home in mid-December. Most households slaughter annually, just after temperatures drop below freezing day and night. Once their total slaughter is in, they divide it between their household and the various kin households that helped with the haying the previous summer.

December 2000.
Photo by S.A. Crate.

brown bear. It reveals the thoroughness with which these and other species are consumed by the Koyukon of interior Alaska. In general, there is a strong seasonality of consumption patterns in most Arctic and boreal cultures (Nelson, 1969; 1983; Helm, 1981; Damas, 1984; Vitebsky, 2005). For example, among modern Nenets, mid-May to mid-June is the “month of bird nests.” During this time reindeer herders can shoot up to 30 geese a day, which provide a welcome addition to their diet at a time when they prefer not to slaughter their animals. For protein during summer migration, Nenets nomads subsist mainly on freshwater fish and similarly try to avoid killing useful animals (Stammler, 2005).

Animals are important to the Koyukon of interior Alaska not only as food and objectives of the subsistence quest, but also as personages and powers who share the world in which humans live (Nelson, 1983). In Eurasia, the utility of tame reindeer has gradually evolved over the last millennium from being primarily a means of transport for hunting other game to being used as meat—an end product regulated by agricultural norms set by the various states (Russia, Finland, Sweden, Norway) (Krupnik, 1993; Vitebsky, 2005; Hukkinen et al., 2006; Müller-Wille et al., 2006). For nomadic herders, meat is a by-product of the process of rejection. In other words, the animals eaten are those that are no longer useful enough to keep (Vitebsky, 2005).

There is a basic geography of consumption in the North, with marine mammals historically being the mainstay of most coastal dwellers north of the treeline, while caribou, reindeer, moose, and other land mammals figure more prominently in the diet of those who live in the boreal forest and forest-tundra regions (Helm, 1981; Damas, 1984; Krupnik, 1993). Within subsistence cultural groups, there can also be distinct ecological “exploitative” zones traditionally characterized by differences in hunting technology and diet (Damas, 1984). Although significant changes are possible in subsistence activities over time within a given region in conjunction with climate and other drivers, broad scale spatial variations persist in the modern Arctic and so have important implications for regional resource management (Forbes and

Kofinas, 2000; Klein, 2005; Nuttall et al., 2005; Forbes and Stammler, 2009).

Among Inuit in North America and eastern Asia, certain types of food with fats and oils are consumed to maintain body warmth – in both people and working dogs – during camping, hunting, traveling, and under emergency conditions (Nelson, 1969; Krupnik, 1993). Vitebsky (2005) remarks similarly on the Tungus reindeer herders of modern Sakha Republic in eastern Siberia; in their climate animal fat is as important as protein. Alaskan Koyukon consciously exploit the fat cycles of many animals, large and small, which strongly affects their harvesting patterns since fatter animals are selected for their better food value and flavor (Nelson, 1983). Skilled hunters can pick out the best animals, ranging from moose to over-flying ducks, in a split second and adjust their efforts accordingly. The Koyukon particularly prize the rich, fatty, and delicious meat of the black bear (Nelson, 1983), although they also consider the body and mesentery fat and rendered grease of both moose and caribou to be delicacies. Fats and oils have many other uses beyond their high caloric and lipid content (Nelson, 1969; Damas, 1984). The meat of the Siberian marmot is so full of fat that it cannot safely be eaten when hot and is regarded as medicine rather than food (Vitebsky, 2005). Indeed, among the Evenki, bear fat is used to heal wounds (Vitebsky, 2005), and marrow fat from the hind legs of mountain sheep is said to make a person a good hunter and stop bones from aching (Vitebsky, 2005).

Animal fats and oils are not commonly eaten alone, but used more as a condiment or additive, and especially in the cold season they constitute an almost essential part of every meal where meat is eaten (Nelson, 1969; Wenzel, 1991). They can also be used as emergency lighting and cooking fuel. Obtaining the seal meat and fat is hard work; an average hunter burns about 3,000 calories a day while standing motionless over a breathing hole and fighting off the cold (Wenzel, 1991). Among Inuit, young ringed seals are said to be the best for eating (Nelson, 1969; Wenzel, 1991). Seal meat is also considered high quality as dog food because it keeps the animals warm during fierce winter gales (Nelson, 1969).

As for food preference, Nelson (1969) com-

compares three different groups of Inuit from Wainwright, St. Lawrence Island, and northern Greenland. Among each group the most preferred food was the one most available. The Wainwright people are traditionally inland Eskimos and take more caribou whenever possible because, as they often say, a person can never get tired of caribou, even though it is easy to tire of all other kinds of meat. Similarly, north Greenlanders whose staple food is seal often say that a person may get tired of all other kinds of meat, but never seal meat. And, in turn, the St. Lawrence Islanders, who apparently shoot a greater volume of walrus than anything else, say that one never tires of walrus.

The use of meat for domestic or subsistence purposes carries with it a completely different set of notions to the use of meat as a commodity. Among Yamal Nenets, a shared meal of fresh, warm, raw reindeer meat and blood is called *aibat* (Stammler, 2005). After the men are finished, women and children are invited to have their share. Everybody brings their own knives for cutting the meat to eat on the spot. *Aibat* vividly exemplifies how the conversion from live to dead property is a conversion from shared rights to exclusive rights. The live animal might have been used by different people for various purposes. During subsistence slaughtering, its resources are shared for the last time, and entitlements literally become more exclusive as the life and warmth leaves the animal. Therefore, fresh, warm, unfrozen meat or blood is shared during *aibat*, but once it becomes cold, the animal enters the exclusive domestic sphere of the owner's household. The practice of slaughtering for *aibat*, in the community sphere of exchange, is done only with privately owned animals.

Similar practices governing the slaughter, consumption, and sharing of food among North American Inuit are detailed by Nelson (1969) and Wenzel (1991). Reviewing historic and modern practices, Wenzel (2005) concludes that sharing among Inuit, or *ningiqtuq*, is more nuanced than can be represented in the two main models prevailing within the literature. The result is an economy that, from Alaska to Greenland, optimizes social inclusiveness rather than the maximization of individual or family economic well-being (Wenzel, 2005).

In modern Nordic reindeer management, the most immediate goal is to maximize the efficiency and profitability of meat production. In the case of Sweden, such so-called rational herd management derives from a combination of agricultural and Saami innovations but is neither completely Saami nor Swedish in content (Beach, 1981). Similarly, the main aim of tundra reindeer herding in Russia from the perspective of the state is meat production (Jernsletten and Klovov, 2002). The number of domestic animals has varied widely over the last century, just as the intensity of herding ranges widely in space and time (Ingold, 1980). Average annual meat production as measured by kilograms per animal increases threefold from so-called low-intensity to high-intensity herding. After the fall of the Soviet Union, numbers declined moderately to precipitously in several sectors of the Russian north, a strong exception being the YNAO, where numbers continued to increase (Jernsletten and Klovov, 2002).

Since the economic significance is minor, there are clearly other factors of reindeer herding that make it attractive to so many people across such a large portion of the Arctic. The strength of the livelihood is probably that it represents a lifestyle that is professionally challenging and rewarding, and thus represents a meaningful life for people (Turi, 2002).

Swedish law permits a maximum of 276,000 reindeer in the country and the number varies annually according to conditions. Since the early 1980s, 70,000 animals are slaughtered annually, about 60% of which are calves, representing some 2,000 tons of meat. About 20% of the production is exported, while in recent years Sweden has also imported reindeer meat, mainly from Russia (Baer, 2002).

According to a report by the Russian Ministry of Agriculture, a five-person family in YNAO needs 385 reindeer for subsistence based on an average supply of meat, furs, and live reindeer needed for transport. However, the general model used in this calculation does not account for the particularities of place; in the North, for example, more transport animals are needed to carry firewood, and in the forest-tundra there might be alternative sources of income and food (e.g., from game) (Stammler, 2005).

On average, the Swedish population con-

sumes only 250 g of reindeer meat per person per year (Beach, 1981). In Finland, average annual reindeer meat consumption is slightly higher at 400 to 500 g per person (Hukkinen et al., 2006; Särkelä. Finn. Assoc. of Reindeer Herding Districts, pers. comm., 2007). This contrasts with the situation among herders of Russia's Kola Peninsula, who in the mid-1990s were slaughtering one animal every six days or



A small sample of the bounty of country food in a permafrost cooler in Tuktoyaktuk, an Inuvialuit hamlet located in the Inuvik region of the Northwest Territories, Canada.
Photos by L. King.

so, thus consuming about 570 g of reindeer meat a day (Konstantinov, 2005). At slaughtering time in the “really venison-oriented public” of Lovozero, village residents are allowed to buy meat at wholesale prices and a typical family stocks their freezer with 30 to 40 kg per person (Konstantinov, 2005).

Country foods in conflict

Country foods have also met with resistance from the outside world. In parts of the Arctic the rise of the animal rights movement has come into direct conflict with country food consumption (Wenzel, 1991). These actions impacted northern residents most notably following the 1969 anti-sealing campaigns, after which the animal rights drive attacked all fur trapping (Myers, 2005). Contaminants, most notably persistent organic pollutants (POPs), present a second area of “conflict,” or pressure not to utilize country foods. Although the 2001 Stockholm Convention on POPs, which obligates the elimination of certain chemicals, the Arctic and its residents who mostly eat high on the food chain, are sinks for POPs. This issue came into public consciousness when high levels of POPs were found in the blood and breast milk of Inuit in northern Canada (Downie and Fenge, 2003).

3.0 Selected Indicator of Contact with Nature: Consumption or Harvest of Traditional Food

Based upon our analysis above, we recommend that the one indicator for contact with nature should be “consumption or harvest of country food”. One of the most frequently cited means of maintaining contact with nature is the harvesting and eating of traditional foods. Chief Charlie Jones of the Pacheedaht First Nation in British Columbia, Canada, who died at age 113, attributed his longevity to eating “proper food” – whale, seal, elk, deer, bear, beaver, and salmon. But he went on to lament that “now the rivers are fished out; there is too much felling of forests and the wild animal have been driven away” (Ross and Child, 2008). These sentiments are echoed across the Arctic where good health as well as spiritual and cultural sustenance are supported by the harvest and consumption of traditional or country food. The harvest and consumption of traditional food is also cited as the primary, if not the only, contact with nature in Arctic societies.

Table 6.1 is a matrix of the consumption and harvest of traditional food as indicators for contact with nature.

Table 6.1: Contact with Nature Matrix

Indicator	Data Availability	Data Affordability	Ease of Measurement	Robustness	Scalability	Inclusiveness
Consumption of Traditional Food	Tier 3	Low	Medium	High	1-4	High
Harvest of Traditional Food	Tier 3	Medium	High	High	1-4	Medium

• 1 = scalable to individual; 2 – scalable to household; 3 - to community; 4- to region; 5 – to country

4.0 Concluding Comments

The primary reasons for recommending the consumption and harvest of country food are: the centrality of its consumption to Arctic cultures and peoples; the availability of data and the ability of communities across the Arctic to collect those data; the generalizability of the concept across Arctic regions, for indigenous and non-indigenous peoples, for rural and urban residents, and for women and men; and finally, the data also lend themselves well to aggregation and to time series.

This indicator provides the flexibility needed in the diversity of Arctic contexts. With it, one could measure both harvest and consumption or could choose one or the other depending on relevance to the particular region as well as ease and feasibility of data collection. Choices can and must be made about: whether to use household or individuals or aggregates of communities and /or regions; how to measure proportions of food consumed by the households (i.e. – none, less than half, half, or more than half); whether to tally harvest by species; and in what contexts kilogram per household could be used.

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Two more examples of how northern inhabitants continue their contact with nature: Sakha freeze extra milk in shallow pans for later use, utilizing the continuous freezing temperatures of the long winter months and, following autumn rains, gather wild mushrooms for fresh use and to preserve. 2000. Photos by S.A. Crate.

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7 Fate control

Jens Dahl, Gail Fondahl, Andrey Petrov, and Rune Sverre Fjellheim

1.0 Introduction

Arctic regions have long been resource peripheries and internal colonies of the states that encapsulate them. Political decisions made in far-flung nation-state capitals and economic decisions made in corporate boardrooms in distant metropolises have determined the trajectories of development that Arctic regions have experienced. Arctic residents are dependent on the resources of their homelands, the health of their ecosystems, and the right to use those ecosystems. Yet their power over the use and protection of these territories and resources has been compromised by outside forces. Thus fate control is of critical importance to the sense of well-being and human development in Arctic areas.

1.1 The Concept of Fate Control

Fate control is, simply put, people's ability to guide their own destiny. While literature on fate control is scant, the concept is highly linked with the more common term "empowerment": the process of achieving the capacity to "make choices and then to transform those choices into desired actions and outcomes" (Ibrahim and Alkire, 2007). Fate control, thus, is the outcome of empowerment.

To control their own fate, people must have the capacity to make their own decisions; they must also have the resources to implement these decisions (World Bank, 2000). Each of these aspects has both an internal and external component: a person or community needs both the

internal capacity and resources and a lack of external barriers to make and implement decisions. The "concrete material, social, and institutional preconditions to exert agency" are critical to empowerment (Ibrahim and Alkire, 2007), and it is these to which we have paid special attention.

1.2 Overview of Fate Control in the Arctic

Fate control, or the lack of it, can be experienced at the personal, household, community, and regional levels. Finnmark County in Norway, Greenland, Nunavut in Canada, or Sakha Republic in Russia may experience economic and political dependence on, respectively, Oslo, Copenhagen, Ottawa, or Moscow. Smaller communities in each of these regions may experience a lack of control in relation to the regional centre, Alta, Nuuk, Iqaluit, or Yakutsk, respectively. Individuals and households in an Arctic community may experience more or less control over their fate than do their neighbors, depending on their capacities and resources. Yet it is the collective control of fate that seems of critical concern to Arctic residents. Many communities and regions of the Arctic endure a residual dependence on outsiders, who play a major role in administering political, economic, and cultural institutions even at the local level, and notably on a higher scale. Boom-bust economic cycles characterize large parts of the Arctic, with concomitant high unemployment and underemployment in many regions, and dependence on transfer payments.

Home Rule building
in Nuuk, Greenland.
Photo: Birger Poppel



Thus, we have focused first and foremost on fate control as a collective benefit.

Peoples of the Arctic give prime importance to fate control: in the *Arctic Human Development Report* (AHDR) fate control was, therefore, mentioned as one of the three main areas that determine well-being in the Arctic (AHDR, 2004). Lack of collective fate control has given rise to demands for self-determination and self-government throughout the Arctic on different scales. In fact, over the last several decades we have witnessed the development of self-government institutions in many areas of the circum-polar North – for example, in Greenland, Inuvialuit, and Nunavut.

While the term “devolution” is often used to describe this process of downward transfer of decision-making power, it also suggests the bestowing of power from a higher to a lower level, ignoring the role of the lower-level groups in demanding this transfer. Rather, the process of transferring decision-making power and concomitant control over resources to more local levels almost always depends on insistence and doggedness on the part of the lower-level institution, as well as acquiescence by higher-level ones.

Fate control has become an essential narrative of Arctic residents, and the desire to determine their own fate has been frequently ex-

pressed by indigenous peoples and groups within the Arctic:

We want to govern our own lives and our own lands and its resources. We want to have our own system of governance, by which we can control and develop our land for our benefit...We must become a people making our own history. To be able to make our own history is to be able to mould our own future, to build our society that preserves the bests of our past and our traditions, while enabling us to grow and develop as a whole people (quoted in Brody, 1957).

Our lives are based upon the endeavors of the past generations; we are living and working in the present and we are building for future generations. Only when we have attained a secure position legally, socially, and financially can our cultural life be fully developed and remain a living culture (quoted in Sillanpää, 1994).

Indeed, the right to fate control for indigenous peoples is enshrined in the recently adopted (13 September 2007) UN Declaration on the Rights of Indigenous Peoples, most notably in Articles 3 and 4 (on self-determination), Article 5 (on distinct political, legal, economic, social,

and cultural institutions), and Article 26.2 (on ownership, use, and control of lands and resources). This United Nations declaration underlines the significance of fate control – in all its aspects – as a key factor for the well-being and human development of indigenous peoples.

However, fate control is not just a preoccupation of indigenous peoples. Arctic residents who are not indigenous, but who were born and/or have established long-term ties within the North also argue for greater control in determining their own future (Thompson, 2008). This is, for example, emphasized when long-term immigrants to the Arctic take part in the political life and claim rights equal to those of the indigenous peoples.

How might we measure changes in fate control over time? Below we identify and then discuss several possible indicators of fate control and consider measures to track changes in these indicators. We focus on indicators for collective fate control, but offer suggestions for measures of individual fate control as well. We conclude by proposing a fate control index.

2.0 Possible Indicators of Fate Control in the Arctic

We identified 12 possible fate control indicators. We then grouped these indicators under the following categories, acknowledging that the categories are not discrete; overlaps exist among them.

Political Power and Political Activism

1. Political participation
2. Perceived political influence
3. Resistance

Decision-making Power

4. Proportion of local personnel in key decision-making positions
5. Local control over place names
6. Rights to land and sea resources

Economic Control

7. Self-generated income
8. Local control of the economy

Knowledge Construction

9. Knowledge/information about politics
10. Access to information
11. Language retention

Human Rights

12. Recognition of human rights

In elaborating on these indicators and considering potential measures for them, we determined that a relatively simple and transparent index of fate control could be created to incorporate elements from the categories above. The different indicators and the proposed fate control index are discussed below.

2.1 Indicators of Political Power and Political Activism

All Arctic countries of today can be described as modern political democracies adhering to four factors:

1. Governments at the local, regional and/or national level are democratically elected.
2. Both men and women have political rights.
3. There are arrangements to ensure the representation of the concerns of indigenous peoples and ethnic and other minorities.
4. Institutions analogous to non-governmental organizations (NGOs) and labor unions exist.

These four factors are key to the existence of real and perceived political fate control.

Institutional arrangements vary from country to country. In the Fennoscandinavian countries, the indigenous Saami have their own ethnopolitical governmental institutions; in Nunavut and Greenland, public governments have established themselves; in Greenland as well as some of the other Arctic countries, people have a long historical tradition of establishing a large number of NGO-like organizations (e.g., women's, youth, environmental, and indigenous organizations). The modern political development in Greenland and Scandinavia would be unthinkable without the existence of strong or influential political parties and labor unions. In Alaska and Canada, the land claims processes were driven by Native or indigenous organizations. Differences in the institutional arrangements and in the power of the various organizations (state, indigenous, NGO) provide challenges to finding commensurable indicators across the Arctic.

2.1.1 Political Participation

Political participation in decision-making is a common measure of empowerment, and it can

be measured in a variety of ways such as the participation of voters in elections, the representation of political platforms via political bodies (e.g., parties), and the number or density of NGOs.

2.1.1.1 Electoral participation

Voting participation is a formalized and comparatively passive but common form of civic engagement in democratic societies. The population exercises the right to vote in national, regional, local – and in selected jurisdictions, indigenous-elections. Consequently, electoral participation is an important indicator of a functioning civil society. It is also an indicator of fate control because the availability of opportunities and willingness to engage in representative democracy are directly linked to the ability to exercise (or implement) control over one's destiny. One distinctive feature of several Arctic electoral systems is the duality of public and indigenous governance institutions.

Saami Parliament, Norway.
Photo: Saami Parliament



Using electoral participation as an indicator has several advantages. First, data are easily available: government statistics exist, and the information has been gathered by the Survey of Living Conditions in the Arctic (SLiCA), which included a question about participation in the last election at various levels (see Tables 176 to 180 in SLiCA, www.arcticlivingconditions.org). Second, data on electoral participation are measurable, and third, the data work across scales.

A disadvantage of this indicator is its internal validity. Arctic countries have substantially different civil society traditions, political systems, and modes of representative democracy (AHDR, 2004): actual and perceived meanings of voting (or non-voting) depend on the country and/or region-specific conditions, socio-demographic stratification of votes, and prevalent attitudes toward political processes. In addition, different elections also have dissimilar “weight” (perceived or real) in terms of fate control. In jurisdictions with strong regional and self-governments, regional and local elections see higher turnouts than do national (e.g., in the Canadian territories, Greenland, and the Faroe Islands). More centralized countries, where national governments exercise considerable authority over local issues (e.g., Russian Federation) show the opposite tendency. Some “hot-issue ballots,” in which stakes of individual voters are high, tend to attract more voters than regular elections (e.g., a 2005 amalgamation referendum drew 74% of voters in the Evenki Autonomous District of central Siberia, whereas the general parliamentary elections in 2003 saw a turnout of only 48%).

Definitional issues also pose problems for comparisons across space: in some places the participation rate is calculated on the basis of the voting age population, in others it is on the basis of the *eligible* voting population, and most frequently it is on the basis of the *registered* voters. In some places in the Arctic registration is voluntary (Alaska), whereas in others it is automatic (Russian Federation). Therefore, in terms of fate control how do we, for example, interpret that the turnout for the Saami parliament election in Norway is very high, but that only a minority of the Saami population has registered?

Also causing problems with this potential indicator are ongoing electoral reforms. Because of this and the other limitations, at the collective level the use of political participation as a proxy indicator of fate control seems limited. However, self-reporting of participation of the various elections open to an individual is a functional measure of activism and reasonable proxy for personal political power.

2.1.1.2 Political representation

The concept of political representation is related to electoral participation. Political representation considers not the willingness to vote, but the opportunity to exercise fate control through representation in political bodies. Presumably, the greater the representation people have, the more opportunities exist to control their destiny. Representation may also affect the propensity to cast votes, since it may influence perception of how much individual votes matter. On the other hand, the “impact factor” of votes from a particular region may determine the degree to which the “voice” of this locality is heard.

For example, when Home Rule was introduced in Greenland, outlying districts sent their own representatives to the Home Rule Parliament, but today this is no longer the case. Further, as part of the amalgamation deal with the Krasnoyarsk Kray, the Evenki and the Taymyr Autonomous Districts in Russia received a right to elect proportionally more representatives to the regional legislature than other municipalities. Political involvement of certain groups of voters (e.g., ethnic minorities) often depends on whether they enjoy special representation arrangements in the governing bodies. The number of women elected or running for election to the various bodies is also an indicator of fate control – at least for half the population.

There are generally two forms of elected political institutions that exert decision-making power in the Arctic: public and indigenous governments. The principles of elections and functions of elected bodies vary across the Arctic, as does the relative importance of these two types of institutions. Some indigenous self-government institutions, such as the Saami Parliaments and the Alaska Native Corporations, give equal

rights to those living inside and outside the original homelands of the group. If a large sector of the electorate lives outside the original homeland, the issues and locus of fate control might look different for the various groups making up the electorate. These complications make measuring fate control, and especially cross-jurisdictional comparisons, challenging.

2.1.1.3 Non-governmental organizations

Another possible measure of political participation is the number of registered non-governmental organizations (including labor unions, political parties and indigenous organizations) in the Arctic. The number of such organizations has been used as an indicator of democratization, though not without criticism (Fisher, 1997; Henderson, 2002; Mercer, 2002). In the Arctic, it appears that NGOs work predominantly in the environmental sphere, although also in the indigenous rights sphere. Local NGOs encourage participation among local inhabitants (including, but not limited to indigenous persons) (Domrin, 2001; Golenkova, 1999).

Could the growth in NGOs indicate increased fate control? The recent heightened constraints on NGOs in the Russian Federation seem to be associated with an increasing centralization and decreased autonomy at lower levels of government. Yet there are also examples of NGOs challenging local fate control: for instance, environmental NGOs opposing hunting and trapping, or even opposing resource development that is supported locally. Thus, using a change in the number of NGOs as a measure poses problems of interpretation.

2.1.2 Perceived Political Influence

It is important that people not only have the opportunity to participate in the political process, but also to feel that they can make a difference by influencing the process. Indeed, a demand for increased control over their fate could indicate a lack of perceived political influence, although political apathy can also result from a perception of lack of control. Perceptions of political influence can only be measured directly by such surveying. SLiCA included questions on whether people thought it mattered if they voted and whether they were satisfied with the influence they have over the

management of different resources (see SLiCA Questions F.12, H.7, H.9; www.arcticliving-conditions.org, Tables 200-203, 227-234).

Voting patterns, especially “protest” voting, might be used as a proxy, but this poses problems of assumptions regarding reasons why the populace is voting in certain ways. Also, different cultural traditions of protest voting challenge the validity of this indicator.

2.1.3 Resistance

In broad terms, resistance might be seen as an indicator of lack of control, or as an indicator of an incipient stage in the evolution of empowerment. Strikes, demonstrations, and acts of civil disobedience all involve the opposition to decisions imposed and actions taken by higher-level authorities. Resistance, and particularly acts of civil disobedience, serve as ways for marginalized populations to make their concerns visible to state authorities and to demand that the state deal with those concerns.

The Arctic has witnessed many cases of civil disobedience, especially on the part of indigenous peoples. An examination of several of these cases over the last 150 years (Dahl, nd)

suggests that from an analytical point of view, resistance is a good indicator of progress, both facilitated by and encouraging the evolution of more localized social, political, or cultural control. The cases examined are characterized by circumstances in which the traditional indigenous structures seem unable to handle a new situation, yet in which local people have also not had access to or have tried in vain to use non-traditional (i.e., colonial) institutions. If civil disobedience is an exceptional form of resistance, it nevertheless seems a reliable indicator of the evolution of increased fate control. Many of the cases of civil disobedience have led to spectacular changes in the rights of indigenous people: for example, the Barrow Duck-In in Alaska in 1961 (Arnold, 1976; Blackman, 1989; Burwell, 2004; Case and Voluck, 2002; Dahl, nd), the protest against the icebreaker *Sigyn* in Greenland in 1975 (Dahl, nd); the Alta Dam protest in Norway in 1979 (Dahl, nd; Minde, 2005; Paine, 1982), and the Igloodik Bowhead whale hunt in Canada in 1994 (Dahl, nd; Høgh, 2000).

Problems with using this indicator include lack of comprehensive data, issues of measura-

The Icebreaker *Sigyn*

In May 1975, hunters along the Nuussuaq Peninsula in northwestern Greenland were surprised to see an approaching ship. They soon realized that it was the *Sigyn*, an icebreaker, and that it intended to break the ice between them and the land. The men were hunting on land-locked ice, and they knew that once it was broken it could drift, creating a very dangerous situation. The hunters wondered why they were not consulted or at least warned. Soon their dismay turned to anger, and a group from Niaqornat approached the ship with their dogsleds. The ship's personnel signaled the hunters to clear out of the ship's way, but the hunters refused. One hunter, who spoke some Danish, soon learned that the ship was on its way to the lead-zinc mine of Maarmorilik, at the head of the Uummannaq Fjord.

When the ship's captain failed to persuade the hunters to move, he contacted the authorities. The mine sent a helicopter with the mayor and council members of Uummannaq municipal council. Meanwhile the *Sigyn* attempted to change its course, but once again the hunters blocked its passage.

This may not have been the first incidence of civil disobedience in Greenland. Yet it was founded on promises by the mining company and government officials that the „settlements should not suffer from the mining.“ The hunters eventually agreed upon a compromise for that year, allowing the icebreaker passage through a less damaging route. More importantly, their protest resulted in a ban on icebreaking from 1 January to 1 June in future years, with icebreaking after 15 November conditional on approval from the local municipal council. Compensation was also negotiated for the losses suffered by decreased opportunities to hunt.

The protest, improbable just a few years earlier, accompanied increasing demands in Greenland for greater fate control—a movement that would a few short years later result in Home Rule. Locals insisted that their own interests, including in subsistence activities, be respected in the face of increasing resource extraction by external (Danish) and foreign interests (Dahl, nd).

The Barrow Duck-in

In Barrow, Alaska, May 1961, 138 hunters presented themselves to the game warden to be arrested. Each carried an illegally shot duck. They were protesting the recent arrest of two fellow villagers for shooting geese and ducks out of season.

In rural Alaska, migratory wildfowl are important subsistence resources in the spring. The whale hunt was poor in 1961, by May ice-based seal hunting was dangerous, and the caribou had not yet arrived. Yet an international convention between the US, Canada, and Mexico prohibited the shooting of migratory wildfowl during the only season that they were to be found in northern Alaska. Long mostly ignored, the treaty was suddenly being enforced – likely because of the power politics deriving from Alaska gaining statehood in 1959.

The Native resistance ended with the charges being dropped and the villagers being told that they would receive forewarning of all future inspections. More importantly, the resistance paved the way for much broader efforts, first in terms of Aboriginal subsistence rights, and eventually in terms of land claims. This act of civil disobedience was an initial assertion of the Iñupiat taking control over their fate, one that would provide a paradigm for future resistance to assaults on Aboriginal lands and livelihood (e.g., Project Chariot, Rampart Dam) and one that helped unite Native Alaskans politically in their eventual demands for recognition of their rights to land (Dahl, nd).

bility and even definition (what constitutes an act of resistance or civil disobedience), and interpretation. Moreover, it is likely that the incidence of resistance activities would take a bell-shaped curve rather than a linear correlation, being low in cases of very repressive regimes where almost no fate-control exists, and low again in cases where fate control is very high.

2.2 Indicators of Decision-making Power

2.2.1 Proportion of Local Personnel in Key Decision-making Positions

Having “outsiders” inhabit key managerial positions may erode a community’s or region’s fate control. This feeling is heightened when those occupying such managerial positions do not speak the local language. Yet many areas of the Arctic experience a residual dependence on outsiders to run and administer political, economic, and cultural institutions. Requirements of formal education for such positions reinforce these arrangements. A concern here is that decisions by an outsider may not inculcate local values (cultural, environmental, etc.).

This indicator, while of interest, poses difficult questions of how to define “local.” One approach would be to measure indigenous,

rather than local, managers; yet this might lead to significant misrepresentation of the situation. We considered whether a proxy measure could be created, and we contemplated one that combined a probability of living in a locality for a certain time (e.g., more than 10 years) with a probability of holding a managerial occupation. We dismissed this indicator as posing intractable problems in terms of data availability and measurability.

2.2.2 Local Control over Place Names

Place naming has long constituted part of the process of asserting sovereignty over territories (Berg and Kearns, 1996; Thorton, 1997). The “inscription of names to places in the landscape can be read as a trope for enfranchisement” (Heikkila, 2007); the act of naming places and having those names recognized, accepted, and used by others is inherently an act of power and authority. In fact, renaming of places by indigenous peoples has been referred to as “re-conquest” (Herman, 1999). This is exemplified in some areas of the Arctic where there has been a concerted effort to have pre-colonial place names (including names of streets, public institutions, mountains, etc.) officially recognized and reinstated on maps, road signs, and elsewhere where non-indigenous place names have been imposed. An interesting variant of this occurred in the Canadian Arctic in 1997 when

The Paradox of the North

„In the North we have found a paradox. On one hand, the North is the part of Canada in which Aboriginal peoples have achieved the most in terms of political influence and institutions appropriate to their cultures and needs. On the other, the North itself is a region with little influence over its own destiny. Most of the levers of political and economic power continue to be held outside of the North and, in some cases, outside Canada...The political development achieved in the last 20 years in parts of northern Canada is striking. A framework for the future is beginning to emerge. As far as the economic and social future of northern communities is concerned, however, complacency would be ill-advised“ (*Report on the Royal Commission on Aboriginal Peoples*, 1995).

the people of northern Quebec fought the provincial government's policy requiring the re-naming of several English place names into French (George, 1997).

This indicator has appeal as a proxy as it would seem to measure bottom-up efforts for local control. As well, the use of indigenous place names has been suggested as an indicator of cultural revitalization by at least one indigenous (though not Arctic) group, with resultant measures including the “number and/or percentage of maps and signs produced...that are bilingual or primarily use [the indigenous language]“ and “the number and/or percentage of maps and signs...that are partially bilingual“ (Quinn, 2007). While these local level measures would be difficult to collate, possible measures do exist. As all Arctic countries have official committees or boards to consider place name changes, it would be possible to track the

locally requested changes of names that are successful. Alternatively, maps could be used to track such changes.

However, the issue of relevance remains. This indicator may have limited importance to non-indigenous peoples. Indeed, non-indigenous and indigenous inhabitants of the same area sometimes have opposing agendas regarding the renaming of places, which complicates the indicator's validity as a measure of fate control. In addition, the importance of renaming may vary over Arctic space. For instance, it appears that renaming places is of higher importance in the Canadian Arctic than in the Russian north (although some renaming occurred in the early post-Soviet period to purge the landscape of names linked to the more oppressive facets of Soviet regimes).

2.2.3 Rights to Land and Sea Resources

For many Arctic residents, but especially indigenous peoples, the rights to possess, occupy, and use their homelands and the resources these contain is intrinsic to their identity. Enjoying such rights, the decision-making powers they entail, and the economic benefits they guarantee is a key component of fate control. The AHDR asserts that “local ownership of resources may deliver significant benefits to local and sub-federal government“ (AHDR, 2004), noting the role of Prudhoe Bay in the North Slope Borough in Alaska's well-being.

In the Arctic, land and resource rights were traditionally collective rather than invested in individuals; ownership was not a concept common to most indigenous peoples. During the colonial period, states claimed and asserted proprietary, exclusionary, and disposition rights to Arctic territories and to the resources they embrace. While use rights to some renewable resources, such as flora and fauna, were often afforded to Arctic residents, governments leased or otherwise transferred non-renewable and some renewable (e.g., timber, fish) resource use rights to external companies. These users often eroded the ability of Arctic residents to practice their use rights, through competition over land and resources and environmental degradation. In short, Arctic residents have often benefited very little from extraction of their homeland's resources, while suffering high costs.

Piece of map showing
Inuit place names
in syllabic.
Reproduced with the
permission of Natural
Resources Canada 2009



Meanwhile property rights in the Arctic have been increasingly formalized, from a “commons” situation where customary law prevailed to legal recognition by the state (AHDR, 2004). Formalization includes transfer of authority between levels of governances, as well as negotiated agreements to these share rights among such levels.

2.2.4 Local Control over Resource-governing Institutions

The ability to exercise the right to land and resources depends on the capacity to effectively regulate (govern) the use of the resources. Therefore, the rights to land and sea resources should be considered together with the measures of local control over resource-governing institutions.

In many areas of the Arctic, states have assumed control over significant segments of the land and resources, transferring decision-making power to southern capitals. More recently, the fallacies of doing so have become apparent; state institutions have begun to recognize the role that local knowledge may play in helping to wisely manage resources and plan land use, and that an integrated approach to resource management is more productive (Berkes et al., 1991; Smith, 2002; Usher, 2000; White, 2006). Numerous co-management regimes have developed in response to local demands for greater control over land and resources as well as to state realizations of the benefits such arrangements may bring (AINA, 1995; Osherenko, 1993). Through co-management, local communities are able to reassert control and bring local knowledge and values to bear on resource and land-planning decisions.

The following factors could serve as indicators for rights to land and sea:

1. The proportion of renewable resources in a given jurisdiction that are under the control (use and disposition) of local authorities. This could be calculated for key resources such as wildlife, fish, and forest/timber.
2. The proportion of land in a given jurisdiction (township, county, region, province, indigenous settlement area) over which local population has some significant form of exclusionary rights (ranging from rights to deciding by

local referendum whether external development is allowed to co-management rights over territory).

3. The proportion of non-renewable resources in a given jurisdiction that are under the control (proprietary and disposition) of local authorities. This could be calculated for key resources such as minerals and hydrocarbons.

The indicators are understandable and relevant, yet information might provide a *de jure* picture that differs from practices on the ground. The reliability of data is likely to vary by geographic area, but the ongoing cost of collecting data would be relatively low, and the data would be comparable over time and sensitive to change. Comparisons over space would be aided by not focusing on “ownership” but rather on the specific property rights (use, disposition, exclusion, proprietary) relevant to each indicator.

2.3 Indicators of Economic Control

A distinctive feature of the Arctic economy is its inherent duality with the co-existence of a land-based traditional sector (also ice- and sea-based), which is frequently geared toward subsistence, and an export-oriented resource-based sector, which is frequently based on non-renewable resources. The two are interconnected by their reliance on natural resources and by their impact on the existential experiences of Arctic residents engaged in either or both types of economy. Recent decades have witnessed the increasing empowerment of local, particularly indigenous, populations to control the lands and resources. Colonial discourses of *terra nullius* and resource hinterlands have been replaced by more pluralistic discourses of indigeneity, environmentalism, and sustainability. Gains in local control over the primary factors of production (i.e., land and resources) have been institutionalized in the legal systems of Arctic states, most prominently through land claims agreements. The degree and extent of control vary, as do implementation mechanisms.

At the same time, globalization trends have increasingly exposed the Arctic to external market forces and actors. The export orienta-

tion of the staples sector has always dictated a resource frontier that was an internationalized, contested, and dependent on space, prone to external domination and control. Integration and deregulation trends over the past three decades have exacerbated this exposure. Large-scale extraction projects require huge investments, and export economies are consequently dominated by large, vertically integrated corporations, which command production, employment, and infrastructure development in Arctic regions.

These opposing trends of increased self-governance and globalization have created a complex and highly contested environment in which there are a number of ways to measure economic fate control, both institutionally and practically. These include qualitative assessments of legal systems of resource governance and empirical analysis of Arctic economies in terms of ownership and control over their economic base and export dependency.

2.3.1 Self-generated Income

The idea of using self-generated income as an indicator evolved out of discussions on the use of transfer payments as a promising (in its ease) indicator. Self-generated income, as a partial inverse of transfer payments, fulfilled our desire to focus on “strength” indicators. Also, the notion of transfer payments offers many complications – from the highly conceptual (e.g., to what extent these funds should be considered payments by outsiders for access to local resources rather than “welfare”) to the more prosaic (e.g., what is included in different countries’ understandings of what constitutes transfer payments to individuals, locales, and regions, and what challenges this provides to comparability across space).

The relevance of self-generated income to fate control lies in the idea of financial autonomy. Self-generated income can be calculated at all levels: individual, household, community, and regional. Proxies could include self-employment income plus earned income (wages), or local investment capacity (savings or other measures).

Accessibility of data poses a problem at the lower levels; reliability would depend on the proxy adopted. The indicator certainly is sensi-

tive to change and temporally comparable; comparisons across space and especially across international boundaries would pose greater problems.

At levels above the individual or household, economic self-reliance can also be estimated for different jurisdictions based on their fiscal independence. This may be measured by the ratio of self-generated revenues to expenditures. Regional and municipal authorities, as well as Aboriginal governments, that are fiscally autonomous may enjoy significantly increased fate control. Fiscal dependency, caused either by an insufficient local tax base or imbalanced revenue-sharing regulations, curtails the ability of responsible officials to exercise effective control over their jurisdictions. Budgets in many northern regions depend heavily on transfers from upper levels of government. In Canada, for instance, the federal government provides 60% to 90% of budget revenues to the northern territories. This case exists even in relatively resource-rich areas, when skewed revenue sharing practices are in place. For example, Russia’s northern regions are able to retain only 20% of the mineral resource use tax while the remainder flows to Moscow (Oleynik, 2007). In 2005-06, the Canadian government received \$244 million in oil, gas, and diamond royalties from the Northwest Territories, leaving no share to the region (Roland, 2007).

2.3.2 Local Control of the Economy

Export-orientation inevitably places a regional economy in a dependent position in respect to foreign markets. The boom and bust cycles have defined the economic time-space of the Arctic ever since the fur trade and cod fishing opened up the Arctic as a staples frontier. Now at the beginning of the 21st century, export-oriented sectors, mostly based on the extraction of hydrocarbon and mineral resources, timber, and fish, still dominate the economic landscape of the Arctic. The primary sector accounts for 31% of the Arctic’s gross national product (GNP), provides most of the Arctic’s exports, and supplies the bulk of well-paid jobs (Glomsrød and Aslaksen, 2006). Resource dependency varies over the Arctic’s regions, but large-scale industrial extraction projects generate the lion’s share of export revenues.

This export reliance can diminish local control over economic destiny and leave regions relatively defenseless against external fluctuations of commodity prices or political decisions when such resources are not owned or controlled locally. The higher the weight of the export-oriented sector of the economy, the less the ability of local residents to exercise control over their economic futures.

An export-orientation ratio could serve as an indicator, but it would be difficult to interpret what upward or downward trends actually mean. Export reliance is not wholly negative. The other side of this Janus is economic “openness.” From a neoclassical economic interpretation, openness can be beneficial, as it stimulates integration, competition, and exchange. More open economies perform better than isolated ones, especially in the case of small economies with limited production mix. In the Arctic, the utility of such openness is, however, more questionable, given the staples nature of the economy and the level of control over various staples. Uneven terms of trade between raw materials and manufactured goods severely undermine possible efficiencies of resource specialization and produce dependency rather than prosperity, which is a point that was argued by Harold Innis in 1930 (Innis, 1999).

Thus, the fundamental question related to

control over economic fate is not whether open, export-oriented economies are more or less efficient, but whether northerners exert sufficient power over these economies to determine their own economic destiny. A prevalence of foreign (or external) control over entities that dominate the Arctic basic industries would signal less empowerment and control over destiny. No matter how readily the external actors engage in power-sharing agreements, co-management, or other partnerships with local stakeholders, the seat of final decision-making will remain in distant headquarters, dictated by shareholders’ interests.

We assume that the propensity of local stakeholders to implement control over economic decisions is proportional to the degree of local ownership of businesses in the region. Whereas a separate measure can be developed (e.g., an ownership control ratio), this indicator is directly linked to the ability to control local institutions of economic governance in general (as discussed in the previous section). In addition, the fundamental problem with implementing measures specifically based on corporate (business) control arises from the complexity of corporate ownership structures. Thus, although it is possible to develop such an indicator to better reflect fate control in terms of economic institutions, in this report we consider this

The production of nickel ingots in Monchegorsk, Kola Peninsula, Russia.
Photo: Rasmus Ole Rasmussen



unfeasible, since the measures of the institutional fate control have been already introduced.

2.4 Indicators of Knowledge Construction

2.4.1 Knowledge and Information about Politics

Control of destiny is aided by having sufficient and good quality information about policy changes and political decisions that will affect an individual's life. "Informational assets" are seen as an important ingredient of self-empowerment (Alsop and Heinsohn, 2005). SLiCA included a question about level of knowledge about politics (see SLiCA nd, Question F.4; www.arcticlivingconditions.org, Tables 194 to 198). However, this indicator did not appear to merit development because its direct relevance to fate control seemed more limited than other indicators under consideration. As well, data would be difficult to access without surveying.

2.4.2 Access to Information

Access to information is critical to making informed decisions about fate, and it has been noted as a key ingredient to increasing empowerment (Alsop and Heinsohn, 2005; Alkire, 2005; Ibrahim and Alkire, 2007). Thus we considered such access as a possible measure of fate control. Our discussions especially considered access to information about politics, but information also may improve the ability to direct cultural and economic futures.

Measures of this indicator could include the level of Internet coverage, the number of newspapers sold or published per capita, the number of radio or TV stations carrying news available, the number of visitors to relevant websites, etc. It seems that the Internet might be the best proxy, given global trends.

Internet coverage could be measured by Arctic people's addresses and subscriptions, although doing so would probably be very difficult, if not impossible. Coverage could also be measured by phone access, both land-line and mobile. Another possible measure considered was identifying the number of websites produced in and by Arctic residents/communities.

However, while this method could be feasible for sites and services produced by public authorities, it is problematic for privately produced sites as they can be hosted anywhere. Ultimately, we felt that the relevance of these measures to the indicator is not fully clear.

2.4.3 Language Retention

While language retention may be seen as a critical measure of cultural vitality (see Chapter 5), it also is an important measure of fate control and can serve as a valuable proxy. Successful language retention requires a relatively advanced institutional and society framework that extends beyond the development of language curriculum and course offerings. A living language requires a certain number of speakers. For young people to choose and use their language, they have to see it as an asset for their future.

There are different ways of measuring language retention, including its use in the community, in the work environment, in the media, in the political area, and in the educational system (at different levels). We can also look at whether the language is supported by new technologies (such as spell-check tools for computers, web pages, etc.). Finally, we can consider whether the native language is regarded as an asset by non-native speakers.

This indicator appears to be focused on the fate control of indigenous peoples rather than Arctic residents as a whole. Yet we propose an index that considers speaking one's own language, whether that of the dominant population or of a minority population (see below). We feel this indicator not only addresses knowledge construction, but also the issue of human rights. As language retention is being suggested as the indicator for another domain, the data will be available.

2.5 Indicators of Human Rights

In a global perspective, concerns regarding human rights, including the protection of minorities, have increased in recent years. In the Arctic region the focus seems to have been mainly on the development of indigenous rights. Human rights, including indigenous rights, are critical to fate control.



Indicators of the recognition of human rights could involve examining whether a state has ratified key conventions that address human rights, such as the International Labour Organization (ILO) Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries, or the United Nations Declaration on the Rights of Indigenous Peoples. Other notable issues that have an impact on human rights in the Arctic are climate change, rights to access resources, and protection of cultural rights. States' adoption of conventions, laws, and agreements that protect such rights could be monitored (e.g., the Native American Graves Protection and Repatriation Act and the National Museum of the American Indian Act in the US, the Utimut Agreement in Denmark-Greenland, the Migratory Bird Treaty Convention of North America, and various EU bans on the import of seal skins).

Formal human rights mechanisms such as these are valid indicators of fate control. They fulfill the criteria for testing and assessment in terms of data availability, internal validity, robustness, and simplicity. As indicators they do pose challenges in terms of which treaties,

agreements, and conventions to include, and the focus is mainly on the indigenous population (or at least this will likely be the perception of many Arctic stakeholders). Perhaps the largest drawback is that they work mostly at the national level.

Human rights cut across political, economic, and cultural domains. A number of other indicators indirectly address human rights. As components of our collective fate control index, we have chosen indicators that address human rights, and especially indigenous rights in terms of political power, decision-making power, and knowledge construction.

3.0 Selected Indicator of Fate Control

3.1 A Fate Control Index

A possible and rather simple, but powerful, way of looking at fate control is to create an index where a region (community, district/county, province/territory/republic) would be evaluated under each of the following four measures. In proposing this index we recognize that "com-

The village Kangeq was an active settlement with a total population of 118 inhabitants in 1918, compared to 410 in Nuuk at the same time. Fisheries were thriving, and a plant for salting and drying fish was established. The village was abandoned in the 1960s, but most of the houses and the old fishing plant are still there.

Photo: Rasmus Ole Rasmussen

posite indexes generate problems of attribute selection and weighting“ (Crilly et al., 1999; Fahey 1995). Transparency is sacrificed, and aggregation is problematic. On the other hand, their advantage for comparative and analytical purposes is difficult to dispute, and, not surprisingly, many existing human development and well-being indexes are composite ones (e.g., UN HDI, Community Well-Being Index [McHardy and O’Sullivan 2004]).

We developed the fate control index as a combination of individual indexes that characterize the sub-domains of fate control (see Table 7.1). These measures cover the different categories of concern, identified above, that we feel are key facets of fate control: political power, decision-making power, economic control, knowledge construction, and human rights. Each measure is described below.

3.1.1 Component Indicator 1 The percentage of indigenous members in governing bodies (municipal, community, regional) relative to the percentage of the indigenous people in the total population

All Arctic communities consist of indigenous peoples, settlers, and immigrants. Seen in the perspective of human development, fate control should imply that none of these groups are discriminated against. Although the usual situation might be that the indigenous peoples are disfavored, any kind of discrimination or unequal power signals less control.

This indicator measures relative political activity and power among different ethnic groups. It can be measured at the municipal, community, regional, or national level.

- If the indigenous population has 40% of the

seats and makes up 80% of the population, the score will be 0.5.

- If the indigenous population has 80% of the seats and makes up 80% of the population, the score will be 1.0.
- If the indigenous population has 90% of the seats and makes up 80% of the population, the score will be 0.88.

The highest fate control will be 1.0 and scores below or above indicate less control.

3.1.2 Component Indicator 2 The percentage of surface lands legally controlled by the inhabitants through public governments, Native organizations, and communes

As noted above, the ability to regulate the use of land and resources is a key component of fate control and to the well-being of Arctic residents. This indicator thus addresses political power, economic control, and decision-making power, while having a cultural dimension as well. Moreover, as international conventions stipulate indigenous rights to land, this indicator incorporates a dimension of human rights. Focusing on legal authority (control) may help to avoid the “ownership” conundrum of private title, a Western-centric ideology of development. Legal control may be implemented through various mechanisms, including, but not limited to, ownership (public and private), lease, right of use, and delegated/assumed governing authority exercised by northern residents or institutions. Legal authority to land and resources incorporates, at local and higher levels, the ability to evoke customary law and tenure systems that are culturally or otherwise locally relevant.

This indicator ranges from 0.0 to 1.0. (e.g.,

Table 7.1: Index of Fate Control (Collective)

Component Indicators	Sub-Domains
The percentage of indigenous members in governing bodies (municipal, community, regional) relative to the percentage of the indigenous people in the total population	Political power/ human rights
The percentage of surface lands legally controlled by the inhabitants through public governments, Native corporations, and obshchiny	Decision-making power/ human rights
The percentage of public expenses within the region (regional government, municipal taxes, community sales taxes) raised locally	Economic control
The percentage of individuals who speak a mother tongue (whether Native or not) in relation to the percentage of individuals reporting corresponding ethnicity	Knowledge construction/ human rights

Table 7.2: Data Challenges

Indicator	Data Availability	Data Affordability	Ease of Measurement	Robustness	Scalability•	Inclusiveness
Percentage of indigenous members in governing bodies relative to percentage of indigenous people in total population	Tier 2	√	Medium	√?	1-5	-
Percentage of surface lands legally controlled by local inhabitants	Tier 2	√	Medium	√	3-5	√
Percentage of public expenses within region raised in that jurisdiction	Tier 2	√	High	√	3-5	√
Percentage individuals who speak mother tongue in relation to percentage of individuals reporting corresponding ethnicity	Tier 2?	√	Medium	√?	1-5	√

• 1 = scalable to individual; 2 - scalable to household; 3 - to community; 4- to region; 5 - to country

50% = 0.50). The measure would not include federal lands not directly controlled by local populations. It would include lands under long-term lease or use such as “territories of traditional nature use” (territoriya traditsionnogo prirodopol'zovanie) in the Russian Federation.

3.1.3 Component Indicator 3 The percentage of public expenses within the region (regional government, municipal taxes, community sales taxes) raised locally

This indicator provides one measure of economic control. Without fiscal independence, a democratically elected and popular government may nevertheless have limited ability to carry out its decisions.

This indicator ranges from 0.0 to 1.0. (e.g., 50% = 0.50)

3.1.4 Component Indicator 4 The percentage of individuals who speak a mother tongue (whether Native or not) in relation to the percentage of individuals reporting corresponding ethnicity

Language retention serves as a proxy for fate control in terms of knowledge construction and human (and particularly indigenous) rights.

- If 25% of individuals who claim a specific ethnic background claim to speak that group's

mother tongue, and 75% do not, the score will be 0.33.

- If 100% of individuals who claim a specific ethnic background claim to speak that group's mother tongue, the score will be 1.0.

This indicator ranges from 0.0 to a high of 1.0.

The collective fate control index results from adding the four component indicators. The score thus ranges from 0.0 (minimal fate control) to 4.0 (high fate control).

The four components together highlight the key areas of collective empowerment in the Arctic. In term of the effectiveness of the indicators chosen (Parkins et al., 2001), we feel that the proposed measures for the four indicators are understandable (i.e., it is easy to discern what they are telling us); they are relevant to the indicators; data are accessible, retrievable and mostly trustworthy; and the cost of collection is reasonable (see Table 7.2). As well, it should be easy to compare data over time.

3.2 Future Directions: Index of Individual Fate Control

We also offer the possibility of calculating an individual fate control index that parallels our collective fate control index. The sense of control over destiny is an important parameter of fate control. Subjective judgments about indi-

Table 7.3: Index of Fate Control (Individual)

Composite Indicator - Individual	Sub-Domain
The percentage of elections in which an individual votes	Political power/ human rights
Satisfaction with influence local people have on the management of natural resources	Decision-making power/ human rights
Satisfaction level with one's standard of living	Economic control
Percentage of individuals who speak mother tongue (whether Native or not) in relation to percentage of individuals reporting corresponding ethnicity	Knowledge construction/ human rights

vidual empowerment personify the degree and effectiveness of fate control.

Whereas our collective measures are largely available from the secondary data source, for our index we suggest relying on SLiCA-type data, with the provision that in the future such data should sample all Arctic residents, not just indigenous residents (see Table 7.3).

3.2.1: Component Indicator 1 The percentage of elections in which an individual votes.

This indicator is calculated as the number of elections the individual voted in divided by the number available to him or her.

Political power is exercised primarily by voting. SLiCA Question F.6 asks, “Which of the following last elections did you vote in?” It offers six types of elections for Alaskan variant of survey: city, traditional council, village corporation, native regional corporation, state, and national. The respondent answers “yes,” “no,” or “not applicable” to each question. Thus a respondent’s political participation score would be calculated by dividing the number of “yes” responses by, in this case, six minus the number of “not applicable” answers.

Scores would run between 0.0 and 1.0 (=100%), with 1 being indicative of the highest level of political participation

3.2.2 Component Indicator 2: Satisfaction with influence local people have on the management of natural resources.

This indicator offers a proxy for capacity in terms of ability to exert influence over local land and resource issues. Two questions from SLiCA would combine to calculate an indicator of individual satisfaction: H.7 (on satisfaction with the degree of influence that local people

have on the management of local renewable resources) and H.9 (on satisfaction with the degree of influence that local people have on the management of local non-renewable resources). An answer of “very satisfied” would be assigned a score of 4; a “very dissatisfied” a score of 0. The answers for both questions would be combined, and then divided by 8, to receive a score between 0.0 and 1.0.

3.2.3 Component Indicator 3: Satisfaction with level with one’s standard of living.

This indicator offers a proxy for economic control at the individual level. SLiCA Q.E.24 asks how satisfied an individual is with her or his standard of living. An answer of “very satisfied” would be assigned a score of 4.0; a “very dissatisfied” a score of 0.0. The answer would be divided by 4, to receive a score between 0.0 and 1.0.

3.2.4 Component Indicator 4: The percentage of individuals who speak a mother tongue (whether Native or not) in relation to the percentage of individuals reporting corresponding ethnicity.

This indicator is identical to the one used for the collective fate control index and incorporates the domains of knowledge construction and human rights:

- If 25% of individuals who claim a specific ethnic background claim to speak that group’s mother tongue, and 75% do not, the score will be 0.33.
- If 100% of individuals who claim a specific ethnic background claim to speak that group’s mother tongue, the score will be 1.0.

The individual fate control index results from

adding the four component indicators. The score thus ranges from 0.0 (minimal fate control) to 4.0 (high fate control).

This individual index depends on surveying. It would require an effort akin to the SLiCA project, but one that involves the whole population of the Arctic, not only the indigenous population.

3.3 Final Proposal: A Single Indicator of Fate Control

While we feel that the collective index of fate control presents a more complex and, therefore, more realistic indicator of fate control, the problems associated with composite indexes encourage us to select one indicator above others, to be used where the composite is considered too problematic. Components of our fate control index appear as indicators for other domains; thus we propose that if the index is not to be used, the single most important indicator (given the larger context of the group of Arctic social indicators recommended in this report) be the percentage of surface lands legally controlled by the inhabitants through public governments and Native corporations.

4.0 Concluding Comments

Fate control is one of the primary indicators of human well-being in economic, social, political, and domestic realms. An ability to control people's own destiny, as well as to exert authority over land and resources is a particularly important indicator in the context of the Arctic. The notion of fate control is deeply interrelated with other domains of human life, and in many ways defines the framework under which these other domains operate. Given its conceptual complexity and all-pervasiveness, fate control is a highly multifaceted category that is hard to measure by a single indicator. This chapter demonstrates the necessity of building a system of indicators that encompasses a variety of meanings and aspects of fate control.

Our current index and indicators have been constructed using already available or easily obtainable data, and we recommend conducting further data collection in the manner of SLiCA, but encompassing the entire Arctic population (indigenous and non-indigenous)

and all regions of the Arctic. This will greatly enhance the analytical power of suggested indicators and allow communities to better associate sub-domain-specific measures of fate control with their local conditions.

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8

Conclusion: Measuring Change in Human Development in the Arctic

Joan Nymand Larsen, Peter Schweitzer, Gail Fondahl, and Jack Kruse

1.0 Introduction

The long range goal of devising Arctic social indicators is to design and move towards the implementation of a system for monitoring changes in human development in the Arctic and to further our understanding of living conditions within this region. Doing so will ultimately help us to find ways for improving the quality of life in the North.

In this final chapter, we highlight some of the major findings of the ASI work towards achieving this goal, with summaries, main conclusions and list of recommendations based on the content and key findings of the preceding chapters of this report. This is followed by the presentation of a small set of ASI indicators that can be used by the Arctic Council, its Sustainable Development Working Group (SDWG), policymakers, and other stakeholders who are interested in a manageable, yet comprehensive, set of indicators that as a collective provides a good overview of the state of human develop-

ment in the Arctic. The chapter then briefly addresses the critical data challenges identified in this project and concludes with a set of key recommendations regarding future availability of Arctic-appropriate data and an Arctic Social Indicators monitoring system.

2.0 Summary and Major Findings

Health and Population Domain

As described in Chapter 2, an extensive number of indicators of health and population exist. Classical indicators of public health and health care include infant mortality, child mortality, and access to health care. Mental health indicators include suicide rate and self-assessed health; chronic disease indicators include obesity and smoking rate. These indicators would be particularly informative if we could partition the data made by age, gender and ethnicity. But as described in Chapter 2, some challenges related to breaking out data by ethnicity, as well

Small village in North Cape municipality, Finnmark, Norway, September 2009. Photo: Jón Haukur Ingimundarson





The quay in the village Sarfannguit, West Greenland, a thriving fishing settlement with 107 inhabitants (2009). Photo: Rasmus Ole Rasmussen

as to privacy and publication constraints remain. While governmental vital statistics are collected initially at the level of the individual, they are released to the public in aggregated forms that do not always permit sub-regional or sub-group analysis.

Regarding population indicators, a general set of indicators would include: Total population, number of births, number of deaths, and net migration. Secondary indicators derived from population numbers include birth rates, teenage birth rates, mortality rates, infant or child mortality rates, population growth or decline rates and projections, and age/sex/ethnicity composition of the population, including age and sex ratios. Thus, the list is long. But, for each of these indicators there are practical constraints on how small the geographical unit of data collection can be, and data availability presents critical challenges.

To identify a single indicator of human health presents a significant challenge, as quality of life is not a uni-dimensional domain. If nevertheless just one indicator for health has to be identified,

the findings of the ASI Health and Population Domain team point to infant mortality as the best option. Although this indicator has its drawbacks (e.g. it is based on small numbers), its strengths are, as explained in Chapter 2, that it relates directly to quality of life and people's sense of well-being. It also integrates a wide range of health-relevant parameters, including health infrastructure, sanitation, nutrition, behavior, social problems and disease. International comparisons have established its broad validity as a proxy for societal development. In terms of selection criteria infant mortality rates provide a good indicator because the measure is clearly defined, comparable and widely available, and includes data for time series and at sub-regional scales.

Similarly, it is a challenge to choose a single indicator regarding population or demography, with standard indicators such as population size, rates and components of change, and composition all being important. In terms of Arctic communities, one demographic indicator of particular importance has been net migration.

As discussed by the Health and Population Domain team, both in- and out-migration reflect the current local sum of various push and pull factors. While out-migration by young adults can make places economically and culturally less viable, proportionately large in-migration can signal economic strength, but at the same time may place pressure on traditional ways of life. Like infant mortality, net migration integrates different forces, and tells something basic about where one place is heading, or how it compares with others (Chapter 2).

Material Well-being Domain

Material well-being of a place can be defined as a measure of local residents' command over goods and services. As argued in Chapter 3, when constructing an indicator of material well-being for the Arctic we must consider the specific features of the Arctic that make it a special case. Here material well-being is derived from market and non-market activity, as well as transfers from higher levels of government. While the Arctic economy in many ways differs from that of the more industrialized southern regions of the countries which have northern territories, the Arctic regions also vary amongst themselves by the type, quality, and quantity of industrial resources produced, just as they vary by the importance of the indigenous population and the local economy. Different economic and political systems characterize the Arctic regions. These differences present significant challenges for devising appropriate indicators of material well-being.

Indeed, devising and measuring the perfect indicator of Material Well-being that captures the uniqueness of the Arctic economy and the importance of both market and non-market activity and transfers would be both challenging and costly. In selecting an appropriate indicator we need to balance the information it provides with the cost of constructing the indicator. The discussion by the ASI domain team on Material Well-being in the North took as its point of departure the general criticism of GDP. Weaknesses of using the GDP measure as an indicator of Arctic material well-being are many, and include the non-inclusion of non-market production, flow of resource rents, differences in cost-of-living, annual price and out-

put fluctuations, and the lack of consideration of distribution of income and environmental impacts. As discussed in Chapter 3, many indicators exist that represent an improvement over GDP, such as income indicators, economic participation indicators, indicators of basic necessities and housing, poverty, and indicators of net-migration. Indicators such as these, however, also have weaknesses when applied to the Arctic context. Still, based on a range of selection criteria, at least four indicators of material well-being hold promise: per capita household income; net-migration; subsistence harvest; and a composite index that takes into account each of the three sectors of the Arctic economy.

Based on the ASI selection criteria discussed above *per capita household income* is identified as the best indicator currently available. One of its particularly notable strengths is that it provides a more accurate estimate of income in the North than does the standard measure of GDP. Yet it has its limitations: a major disadvantage is that it ignores both direct services purchased with public transfers and also production in the traditional economy. Ignoring subsistence harvest and the transfer economy in effect leaves us with an indicator of minimum material well-being. Aside from this weakness, the primary challenge in the use of per capita household income will be developing a means of adjusting this indicator for price differences between time periods and across regions. At the same time, a fair and reasonable measure of material well-being in the Arctic must take into consideration all three aspects of the Arctic economy; the formal and informal economy, and the transfer component. This could be achieved by either creating a *composite index* that accounts for all three sectors as proposed, or alternatively by recommending a set of three indicators that collectively account for the three parts.

In the final analysis, as with other indicators discussed in this study, until more data become available, including new approaches to primary data collection, any attempt to measure and track material well-being in the Arctic more accurately is incomplete (Chapter 3).

Education Domain

In constructing an indicator for education that



Town of Akureyri, Northern Iceland, summer 2009. Photo: Joan Nymand Larsen

is appropriate to the Arctic context the ASI Education Domain team decided to focus on the post-secondary level. Populations in the Arctic are, in general, more highly educated than in many other areas of the world, even if they lag behind the more southerly regions of their own countries. All forms of educational attainment at an advanced level are considered, including the development of vocational, technical and subsistence skills and expertise, as well as the completion of certificate and degree programs that are of benefit to the individual and the community. This angle to devising an appropriate indicator of education in the North also has the benefit of allowing us to use the constructed indicator as an indirect measure of the overall quality of pre-tertiary educational services, since without strong educational support from early childhood education through elementary and secondary schools, post-secondary educational attainment is likely to be weak.

The ASI Education Domain team considered three indicators of education: the proportion of

students pursuing post-secondary education opportunities; the ratio of students successfully completing post-secondary education opportunities; and the proportion of graduates who are still in their own community (or have returned to it) 10 years later. Of these possible indicators the recommendation is to select *the ratio of students successfully completing post-secondary education opportunities*. The main rationale for this choice rests on a number of important considerations. As explained in Chapter 4, several factors can come into play in determining whether a student completes a program or not, including poor preparation, particularly in basic skills areas such as reading, writing and math, as well as insufficient support systems for academic and cultural acclimatization. Completion rates can provide a measure of both the level of pre-qualifications a student has required prior to entering a program, and also a measure of the extent to which there is a connection between the aspirations and expectations of the students and the kind of programs that are readily available to them. Completion rates are

also a reflection of commitment and adaptability on the part of sponsoring institutions to support students through to graduation. This is especially the case with students who are the first generation in their family or community to pursue post-secondary education.

Participation in, and completion of, post-secondary education opportunities is one sign of a healthy community in the circumpolar North, and as such can serve as a reliable indicator of the role of education generally in contributing to the well-being of Arctic communities. This is especially the case in small, remote, indigenous communities where education can serve as a vehicle for achieving not only individual aspirations, but community aspirations as well (Chapter 4).

Cultural Well-being Domain

The complexity of the concept of culture makes it a significant challenge to determine an appropriate indicator of cultural well-being, one which can provide a universally intelligible measure of cultural wellness across circumpolar populations. In Chapter 5, culture is defined as a concept that includes several dimensions, some of which can be more easily assessed and tracked than others.

Language retention, cultural autonomy, and sense of belonging are all elements that influence overall cultural integrity and are discussed as important components for an understanding of cultural well-being in the Arctic. While various indicators of these three components of cultural well-being can be identified, one option is to construct a composite indicator taking into account each of these three distinct dimensions of culture.

As argued by the ASI Cultural Well-being Domain team, cultural integrity can be evaluated with the help of data that are regularly collected and by ranking local and regional policies and social realities that influence it. In the end, Chapter 5 presents a composite indicator that takes into account cultural autonomy (e.g. do laws and policies recognize institutions that exist to advocate for cultural autonomy or national minority populations?); language retention (what percentage of a population speaks its ancestral language?); and belonging (what percentage of people are engaged in recreation-

al or subsistence activities?). The rationale here is that a composite index presents the advantage of taking into account developments that affect cultural well-being, but that may diverge.

A cultural vitality index, a multidimensional composite indicator, best reflects the complexities and dynamics of culture in the circumpolar North. Such a composite will provide a sense of the state of affairs within the different dimensions of cultural vitality/integrity, which policy makers may find of significant value as indicators are tracked over time and through various local, national, and international developments. However, the drawbacks would include the significant problems of measuring and weighing multiple sub-domains and, thus, such an indicator might be difficult to implement.

While a composite indicator will provide a more multidimensional picture of a complex concept, the Cultural Well-being Domain team chose to also identify a more accessible indicator which might be more readily available, although with significant trade-offs. The advantage of using the single indicator of language retention as an alternative is that data and measurements are readily available. The Cultural Well-being Domain team agreed that no matter whether indigenous or non-indigenous, language holds extensive and profound cultural knowledge and functions as a link between generations that is critical to the practice and retention of cultures. The team members also agreed that language is, in this sense, a facilitator of culture among and between cultural communities.

A group of Dene playing the traditional Hand Game at Ross River, Yukon, Canada. Photo: Rasmus Ole Rasmussen





Adult reindeer takes a break from the intense mosquito harassment outside during summer migration with Nenets herders on Yamal Peninsula. Injured calves are often nurtured closely until their wounds or broken bones are healed and they can migrate on their own.

Even when they are fully grown they remain particularly habituated to people and may request to enter the chum by 'knocking' at the 'door' with their antlers. This animal was about 10 years old at the time and knew quite well how to squeeze himself into and out of the narrow entrance, despite his large rack of antlers.

Photo by B.C. Forbes.

This single indicator is accepted as valid, readily understood by both policy makers and local residents throughout the circumpolar world. All peoples and – all cultures – have language. It is through data about language use and language users, as well as through rates of language retention, that we can get an understanding of overall cultural integrity and vitality (Chapter 5).

Closeness to Nature Domain

Arctic societies have undergone significant change in the last century, due mostly to the forces of globalization, resource development, urbanization, and modernization. These changes, in turn, have affected and transformed Arctic human-environment interactions. Despite these changes, most Arctic inhabitants, to a greater or lesser degree, maintain an interrelationship with

the natural world. Residents of urban and rural areas alike engage in outdoor activities for both utilitarian purposes, to procure wild and domestic food sources, for recreational purposes, and for spiritual purposes.

As discussed in chapter 6, contact with nature is a somewhat intangible attribute of human development in the Arctic and indicators are extremely challenging to develop and difficult to measure. One major constraint to measuring contact with nature is the lack of current data. Among a range of indicators considered, three indicators proved the most robust based on selection criteria: Harvest of country foods; consumption of country foods; and number of people or households engaged in the traditional economy. The Closeness to Nature Domain team recommended as its indicator the consumption or harvest of country food because of the centrality of country food consumption to Arctic cultures and peoples, the availability of data and the ability of communities across the Arctic to collect those data, as well as the generalizability of the concept across Arctic regions, for indigenous and non indigenous people, for rural and urban residents, and for women and men. To use this indicator, one could measure both harvest and consumption or could choose one or the other depending on relevance to the particular region as well as ease and feasibility of data collection. While there are significant challenges related to data collection for measures of this indicator, the team strongly recommends consumption and harvest of country or traditional foods as the best proxy indicator for contact with nature in all Arctic regions (Chapter 6).

Fate Control Domain

Like closeness to nature and cultural well-being, fate control was identified as being of specific concern to Arctic residents. As noted in Chapter 7, while fate control, or the lack thereof, can be experienced at the individual level, it is the collective level on which the Fate Control Domain team decided to focus. The team also noted the overarching significance of this domain to all the other domains.

The Fate Control Domain team proposed an index of fate control, comprising four indicators that it felt to be relatively simple and

transparent, which combines indicators that characterize all of the sub-domains of fate control identified in Chapter 7. The merits of such an index are its advantage for comparative and analytical purposes, and its recognition of fate control's conceptual complexity as a domain.

The index's composite indicators are: 1) the percentage of indigenous members in governing bodies (municipal, community, regional) relative to the percentage of the indigenous people in the total population; 2) the percentage of surface lands legally controlled by the inhabitants through public governments, Native corporations, and communes; 3) the percentage of public expenses within the region (regional government, municipal taxes, community sales taxes) raised locally; and 4) the percentage of individuals who speak a mother tongue (whether Native or not) in relation to the percentage of individuals reporting corresponding ethnicity. Each of these indicators' rationale is explained in Chapter 7. As the above index focuses on collective fate control, Chapter 7 also suggests how a similar index might be constructed for the level of individual arctic resident.

The Fate Control Domain team recognizes that composite indices present challenges in terms of transparency and aggregation, and selection of appropriate weights of individual components. The team suggests that the best single indicator may be the percentage of surface lands legally controlled by the inhabitants through public governments and Native corporations (second component of the index); and suggests that this indicator be tested along with the composite: if it proves an adequate proxy, it could be used in place of the index (Chapter 7).

3.0 A Small Set of Arctic Social Indicators

In this section we summarize our recommendations of a small set of Arctic Social Indicators for tracking human development in the Arctic. The recommended set of indicators is the collection of best-choice indicators representing the best available option from each of the six domains, given the constraints and limitations relating to data availability and to their construction such as in the case where the ASI do-

main teams opted for composite indices because of the complexity of these concepts. The chosen set of ASI indicators represents key elements of prominent features of human development in the Arctic. Once measured, verified and possibly refined through further testing and analysis, this set will help move us further towards the implementation of a system for ongoing monitoring and analysis. It will also provide critical information on human well-being in the Arctic that is accessible to policy makers, Arctic Council working groups, Arctic stakeholders, and others interested in Arctic monitoring and tracking the elements that have been identified as prominent features of human development and quality of life in the Arctic.

Based on a number of selection criteria as described in Chapter 1, and the discussion presented in the six substantive chapters of this report, the ASI working group recommends a list of seven Arctic social indicators. Each of these indicators is proposed by one or more ASI domain teams. Based on preliminary analysis, we expect that these chosen indicators will perform well based on our selection criteria of data availability, ease of measurement, internal validity, affordability, robustness, applicability and attainability at various levels (household, local, regional), and applicability to indigenous as well as non-indigenous populations. The ASI working group has placed special emphasis on the selection criteria of data availability and ability to access data currently.

RECOMMENDED SET OF ARCTIC SOCIAL INDICATORS:

- (1) Infant Mortality (Domain: Health/Population)
- (2) Net-migration (Domains: Health/Population and Material Well-being)
- (3) Consumption/harvest of local foods (Domains: Closeness to Nature and Material Well-being)
- (4) Per capita household income (Domain: Material Well-being)
- (5) Ratio of students successfully completing post-secondary education (Domain: Education)
- (6) Language retention (Domain: Cultural Well-being)



A promising harvest of potatoes between the old wood houses in the Sàmi village of Lovozero, Kola Peninsula, Russia.
Photo: Rasmus Ole Rasmussen

(7) Fate Control Index (Domain: Fate Control)

This final set of indicators will be measured, tested, and possibly also refined depending on the outcome of further testing and analysis in terms of its ability as a collective to track changes and facilitate comparisons among regions in the Arctic. While testing, verification, and refinement is the task of ASI Phase II, in the current report the ASI working group recommends this set as the best possible set given the availability of time and other resources, including availability of data currently. As a collective the set is expected to do a good job of tracking changes in human development.

Still, existing challenges relating to data cannot be ignored. If we did not strive for improvements in data availability and improved quality we would forgo the opportunity and fail to meet the present challenge of obtaining a refined and best-choice set of ASI indicators where trade-offs are minimized to the largest extent possible. It is within the scope of the ASI to identify and work towards meeting these challenges. As demonstrated in this report, several of the indicators proposed throughout this report have weaknesses related to availabil-

ity of data, affordability, and level, and applicability to both indigenous and non-indigenous inhabitants of the Arctic. In order for an indicator to do the job of tracking changes in human development and to be as reliable as possible for making cross regional comparisons, they must adequately reflect what they are intended to measure. It is desirable that they involve the most accurate statistic for measuring both the level and extent of change in the domain of interest.

It is also important that the chosen indicators receive wide support, so that they will not be changed regularly, just as it is critical that the chosen indicators are consistent over time and across places, as the usefulness of indicators is related directly to the ability to track trends over time and compare the well-being of regions. These requirements present significant challenges, e.g. for achieving consistency across regions, including at the local, regional and national levels. The need for consistency in indicators places increased demands on the adoption of common data protocols and metadata across the circumpolar countries and regions.

4.0 Moving toward Implementing an Arctic Human Well-being Monitoring System

As discussed in Chapter 2, to advance beyond the AHDR, we need indicators that can be measured and compared at geographical levels of much smaller scale than the nine general regions, including the local level and ideally the smallest social units possible (household, individual). But one obvious limitation is data availability, which puts practical constraints on how small the unit of comparison can be. As seen, for example, in the case of health, population and income statistics, statistical agencies do not provide disaggregated data below certain minimum thresholds of population counts, for reasons of confidentiality. Analysis of small Arctic communities using government-collected data may present challenges related to artificially rounded or suppressed numbers. This may preclude a more in-depth analysis of small locales in the Arctic, even though these communities are important and of interest to both policy making and research. At the same time, if a particular measure is collected by survey, if sample size is too small, the data for a chosen indicator becomes less reliable.

The long-term monitoring of human development in the Arctic would be greatly facilitated by the regular and frequent collection and reporting of relevant data, including those required for the proposed small set of ASI indicators. The persistent challenge with Arctic data, including quality, accessibility, and consistency, results in critical trade-offs in selecting the best indicator among a set of

possible indicators. As has been demonstrated throughout this report, an ideal set of indicators is largely unattainable because the best measures may not be collected frequently enough, or not at all, to allow yearly comparisons. Our desire for longer time series rather than single measurements may be compromised if the measure changes substantially from one year or period of years to the next. In devising all indicators of human development in the Arctic we face important trade-offs. Such trade-off will of course always exist to some degree, simply because it is impossible to fully capture the complex reality of some concepts and phenomenon in a single measure. Abstractions are always necessary when we attempt to move from complex reality to some manageable level in terms of measurement and analysis. These trade-offs were highlighted in the case of selection of ASI indicators for health, culture and material well-being, but naturally exist for all indicators. Until improvements in methods and extent of data collection, data quality and its availability are fully realized, compromises will need to be made to achieve good indicators that are obtainable at a reasonable cost in terms of both time and resources.

The ASI project was formulated to fill a critical gap in knowledge identified by the AHDR on the construction of social indicators to help facilitate monitoring of changes in human development. The AHDR identified domains of particular relevance to Arctic residents that are important to incorporate in measuring human development in the Arctic. Guided by the AHDR, the first phase of ASI identified a set of Arctic-specific indicators to monitor

As a prelude to ASI-II, let us briefly consider the following working definition of relevant terms:

- | | |
|---------------------------|---|
| a. National | data are collected by a national agency |
| b. Comparable | data collected by a national agency are comparable to that collected elsewhere |
| c. Publication | data are available in hard copy or electronic form from the collecting agency |
| d. Spatial | data are available at the county level (e.g. census area, district) |
| e. Period | data are available over time on at least a 5 year frequency |
| f. Indigenous populations | populations represented among the permanent participants of the Arctic Council |
| g. Special tabulation | data could be made available if the collecting agency made, or permitted, special tabulations |
| h. Compilation | data could be compiled by researchers from existing information |
| i. New data collection | data could be collected using no more than 10 minutes of interview time |

Arctic human development and quality of life in the Arctic. The next step, which constitutes the proposed ASI-II Implementation project (2009-2011), aims to implement the identified indicators, through testing, validating and refining the indicators across the Arctic, and then measuring and performing analyses of select cases, with the ultimate goal of moving toward the adoption by Arctic governments and the Arctic Council of the indicators for the purpose of long-term monitoring of human development.

Ideally, a chosen indicator fits one of the following combinations of criteria:

1. Data are collected by a national agency, are comparable, are published, are available at a county level, are collected at least every five years, and are available for indigenous populations.
2. Data can be made available with special tabulations and otherwise meet all criteria listed in #1.
3. Data can be compiled from existing information and otherwise meet all criteria listed in #1.
4. New data could be collected that otherwise meet all criteria listed in #1.

For each indicator proposed in the six domains, limitations have been considered with respect to national limitations, publication limitations, spatial limitations, period limitations, indigenous population limitations, special tabulation limitations, compilation limitations, new data collection limitations

Based on this, indicators can be divided into three separate tiers:

Tier 1: based on existing published data

Tier 2: data that would be produced by special tabulations from existing unpublished data

Tier 3: would require primary data collection

Preliminary categorization of chosen indicators into tiers was presented in this report. This categorization, however, would need to be expanded to include background details on all Arctic regions for a more comprehensive coverage and complete system of tiers. The more complete application of a tier system, with all indicators being categorized according to tiers based on analysis of data availability in all relevant regions, is a task for further research and is a component of the work on ASI Phase-II on the testing, validation, refinement

A house in the village Sarfannguit, West Greenland. Drying racks for drying fish and reindeer meat are situated outside the house. The settlement had 107 inhabitants (2009).

Photo: Rasmus Ole Rasmussen



and implementation of the ASI monitoring system.

5.0 Arctic Social Indicator Data Recommendations

We conclude this report with a series of recommendations concerning data collection and the implementation of an Arctic Social Indicators monitoring system.

At the outset of ASI, the stated intent was to identify a small set of indicators of human development relevant to the Arctic that could be monitored at a reasonable cost. The ASI team hoped that “reasonable cost” could be operationally defined in terms of indicators that are based on existing information. The team also agreed that a good indicator should:

- have clear meaning relevant to one or more of the six domains of Arctic human development (health and demography, material well-being, education, cultural integrity, contact with nature, and fate control)
- be sensitive to change over time
- be available at least down to a regional level
- be applicable to, and reported separately for, indigenous and non-indigenous populations

Participants at the first ASI workshop were able to achieve consensus on using the six domains of Arctic human development contained in the Arctic Human Development Report recommendations as the basis for organizing the work of ASI. At two subsequent workshops it became clear that within each of these domains, meeting the combined challenges posed by the criteria defining a “good indicator” require either sacrifice of one or more of the criteria, or a relaxation of the assumption that indicators can be based on existing information.

The individual domain chapters detail these challenges. Net migration, for example, while ostensibly based on the most basic data (population, births, and deaths) is not uniformly available for all countries nor for indigenous and non-indigenous populations in some countries. Time series data on harvest and consumption of local resources, another recommended Arctic Social Indicator, are not available on a decadal time scale in North America, Russia, Norway,

Sweden, or Finland. It is therefore not enough to recommend a set of Arctic Social Indicators. Recommendations regarding the steps necessary to measure and monitor them are also required. The following recommendations should enable Arctic states to monitor the well being of their Arctic residents.

Arctic Social Indicator Monitoring Objectives

Recommendation 1. *Design the Arctic Social Indicator monitoring system to meet the following objectives:*

1. *Data are available at a regional level;*
2. *Data are available separately for indigenous and non-indigenous populations;*
3. *Data are available on at least a five-year reporting period.*

The operational definition of these objectives will, of practical necessity, differ across countries. A practical definition for a region in Alaska, for example, is the census area, and in Arctic Canada and Iceland it is the region, while in Greenland it is the municipality, in Norway, Sweden, and Finland the county, and in Russia the oblast or republic (see map generated from Hamilton AHDR/Arctic RIMS). Differentiating indigenous and non-indigenous populations is commonplace in North America, uncommon in Scandinavia, varying over time in Russia, and less important in Iceland. Scandinavian countries, Greenland, and Iceland base much of their social indicators on administrative data available annually while Canada collects such data every five years and the USA have switched from decadal observations to an ongoing sample design that can probably support five year averages.

Depending on the indicator and the nation one of three levels of effort are required to meet these monitoring objectives: (See the indicator matrix in each Chapter for an assessment of the level of each recommended indicator).

1. Data are collected by a national agency and published in hard copy or electronic form.
2. Data are collected by a national agency and require special tabulations to be made available.
3. Data require primary data collection.

ASI Indicators Based on Existing Published Data

Recommendation 2. *Encourage national statistical agencies to participate in development of a metadata database identifying ASI indicators that are already monitored by a national agency and published in hard copy or electronic form.*

While it may seem like a trivial exercise to identify existing published sources of ASI indicators, the experience of ASI team members is that the task is in fact quite challenging. Small differences in national statistical programs (e.g. the definition of an infant used in constructing infant mortality estimates) can affect the comparability of data across countries, or over time.

ASI Indicators Requiring Special Tabulations

Recommendation 3. *Encourage establishment of an international task force composed of national statistical agency analysts and Arctic researchers to identify the special tabulations required to produce comparable ASI indicators and to recommend approaches to produce these special tabulations.*

Special tabulations can assume three forms: (1) processing of publically available electronic files by Arctic researchers; (2) processing of confidential agency data files by arctic researchers who obtain special permission to do so; and, (3) processing of confidential agency files by agency personnel. In some cases it is possible for Arctic researchers to use published, publically available, electronic files to construct ASI variables. This process is not necessarily straightforward. Construction of comparable time-series data often requires different rules in each time period. Geographic boundaries change over time, for example, as do variable definitions. Processing of confidential agency files by Arctic researchers is currently possible as special projects, usually confined to a single data set. Construction of time series ASI variables will require processing of multiple data sets over a longer time period than normally associated with a special project. Processing of confidential agency data to generate ASI indicators by agency personnel represents a currently un-

budgeted agency expense. Task Force recommendations can serve as a basis for agency budget requests.

ASI Indicators Requiring Primary Data Collection

Recommendation 4. *Encourage the collaboration of ASI with researchers who are funded through national research councils to collect primary data*

In the case of indicators requiring primary data collection, ASI needs to collaborate with researchers who are funded through national research councils to collect such data. Such collaboration makes sense for both ASI and funded researchers. ASI benefits from having data required to test and validate measures, and funded researchers can build on the conceptual groundwork of ASI and the joint participation of project researchers and ASI in the testing and validation process. Also, it is important for the full implementation of an Arctic social indicators system that a cost-effective approach to primary data collection can be demonstrated.

ASI Phase Two

Recommendation 5. *Initiate ASI Phase Two with the objective of monitoring the six identified domains of human development in the Arctic*

ASI has made significant progress toward the development of an Arctic social indicator system, having identified a small set of indicators to monitor Arctic human development. The next logical step in monitoring of human development is to test, validate and refine the indicators across the Arctic, with the goal of having Arctic governments adopt the indicators for the monitoring of human development. This step constitutes ASI phase two.

Relationship between Monitoring Networks

Recommendation 6. *Reduce duplication of effort by promoting collaboration among monitoring projects in the Arctic, notably but not confined to, Arctic Observing Networks, (AON), Sustaining Arctic Observing Networks (SAON), and Arctic Social Indicators (ASI).*

The ASI project team endorses and supports the SAON recommendations and further recommends collaboration among and coordination of, the monitoring activities and projects focused on the Arctic. Monitoring social indicators should form a major part of monitoring activities along with biophysical indicators of ecosystem health.

The ultimate goal of the Arctic Social Indicators

project is to assist Arctic governments and communities to promote human development and the highest possible quality of life in Arctic communities. We hope and believe that the Arctic Social Indicators presented in this report will enable Arctic States and communities to measure, monitor, and take actions to promote the well-being of all Arctic peoples.

