Survey of Living Conditions in the Arctic (SLiCA)

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Abstract Major findings of the Survey of Living Conditions in the Arctic (SLiCA) are: (1) A combination of traditional activities and cash employment is the prevailing lifestyle of Arctic indigenous peoples; (2) family ties, social support of each other, and traditional activities have a lot to do with why indigenous people choose to remain in Arctic communities; (3) well-being is closely related to job opportunities, locally available fish and game, and a sense of local control. Well-being and depression (and related problems like suicide) are flip sides of the same coin. Improving well-being may reduce social problems; and, (4) health conditions vary widely in the Arctic: three-in-four Greenlandic Inuit self-rate their health as at least very good compared with one-in-two Canadian and Alaska Inuit and one-in-five Chukotka indigenous people. Findings are based on 7,200 interviews in a probability sample of Iñupiat settlement regions of Alaska, the four Inuit settlement regions of Canada, all of Greenland, and the Anadyrskij, Anadyr, Shmidtovs, Beringovskij, Chukotskij, Iujl'tinskij, Bilibinskij, Chaunskij, Providenskij, Uel'Kal' districts of Chukotka. Indigenous people and researchers from Greenland, Russia, Canada, the United States, Denmark, Norway, Sweden, and Finland collaborated on all phases of the study.

Keywords Living conditions · arctic · inuit · SLICA · indigenous peoples

Motivation for the Study

The initiative for the Survey of Living Conditions in the Arctic (SLiCA) came from the Greenland Home Rule Government. In 1994, Statistics

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Greenland (SG) conducted a survey of living conditions in Greenland, partly based on what has been described as the Scandinavian model (Erikson and Uusitalo, 1987). Analysis of the data caused researchers in Greenland to re-examine their theoretical assumptions. They decided that the dimensions and indicators of living conditions had to be context-specific so that the concept of well-being reflects the life of the respondents and their priorities (Andersen and Poppel, 2002). Thus it was crucial to the research effort that representatives of the respondents, the indigenous peoples, were included as partners in the process. The preliminary discussions with representatives of the respondents indicated that the role of household production in Arctic regions, the strong ties of Arctic people to the environment, and the continuing role of extended informal social relationships were among the dimensions that had to be included in a future living conditions survey. They decided that a multidisciplinary team was needed to assess living conditions—and that it was more important to examine differences in living conditions among peoples with similar cultures and environmental circumstances than to compare living conditions of northern indigenous peoples and southern majority cultures.

By 1997, Birger Poppel (the then chief statistician, SG) and Thomas Andersen (international project coordinator, SG) had consulted with researchers, research institutions, indigenous organizations, and governments in Canada, Norway, Sweden, Finland, Russia, and the United States about the idea of an international comparative study of living conditions in the Arctic. In 1998 the Inuit Circumpolar Conference (ICC) passed Resolution 29 (Section I) in support of the study: "Rapid social change characterizes all indigenous peoples of the Arctic. There is a need to document and compare the present state of living conditions and development among the indigenous peoples of the Arctic." In October 2000, the Arctic Council (a ministerial level international body) formally named the project as a part of its Sustainable Development initiative.

Study Design

SLiCA's conceptual design is described in detail elsewhere (Andersen et al 2002; Andersen and Poppel, 2002). Briefly, our approach is based on previous studies on living conditions, social indicator development and quality of life (Bauer, 1966; Sheldon and Moore, 1968; US Department of Health, Education, and Welfare, 1969; Campbell et al., 1972; Campbell et al., 1976; Andrews et al., 1976; and Allardt, 1975). For a recent review of the state of the art of this field, see Sirgy et al (2006). Although previous research

has shown that commonly applied economic indices such as income and unemployment explain most, but not all, of the variation in a broader array of quantitative statistics (Diener and Suh, 1997:192), these indicators do not offer strong explanations of Arctic peoples' choice to continue living in their communities. As a first step in resolving this inconsistency, the SLiCA definition of living conditions, focusing on resources, is broadened to embrace the full scope of economic production in the North; that is, including the role of household production in Arctic regions and the mixed cash-local harvest economy (Usher et al 2003), Dahl (2000), Wenzel (2000). SLiCA's approach was further expanded to incorporate other dimensions of living conditions that have been previously identified as important in the Arctic. These include: family relationships and spirituality (McNabb, 1991); social adjustment and social support (Larsen, 1996); and ethnic identity (Sprott, 1994). Finally, Diener and Suh's review on the relationship between economic indices, living condition measures, and subjective well-being concludes that these measures do not always agree: including both objective and subjective measures provides an opportunity for greater understanding of living conditions (1997:213). Therefore SLiCA's measurement of living conditions includes both subjective and objective measures.

Questionnaire development took place between 1998 and 2001 in eleven workshops and field pretests in each country. This work involved indigenous people and researchers from eight countries and five social science disciplines. Indigenous steering committees approved the final questionnaire design. The entire process of questionnaire development is documented on the project website[1].

Sample Summary

The SLiCA target population is defined in three elements: (1) indigenous individuals aged 16 (or 15[2]) and over; (2) residing in households; (3) in a traditional settlement region. Although the original intent of SLiCA was to include Arctic Saami settlement regions in Norway, Sweden, Finland, and the Kola Peninsula of Russia, funding difficulties precluded completion of fieldwork in these regions. For the present, settlement regions are defined as shown in Fig. 1 and as follows: Alaska (North Slope, Northwest Arctic, Bering Straits census areas); Canada (Inuvialiut, Nunavik, Nunavut, Labrador Inuit land claims regions); Greenland (all regions); and Chukotka, Russia (Anadyrskij, Anadyr, Shmidtovs, Beringovskij, Chukotskij, Iujl'tinskij, Bilibinskij, Chaunskij, Providenskij, Uel'Kal' districts). The indigenous peoples represented by the data include Inuit in Alaska,

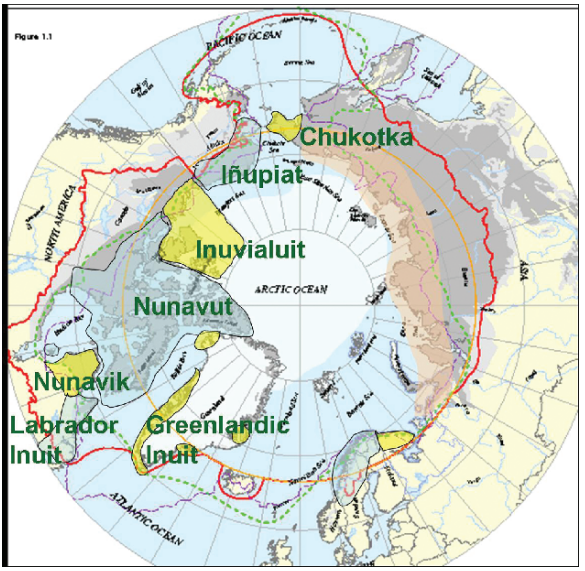

Fig. 1 Sample regions

Canada, Greenland and Chukchi, Inuit, Evan, Chuvan, and Yukagir in Chukotka. Probability sampling procedures were used in each country to ensure that each adult had a known probability of selection. Results are weighted to properly reflect these probabilities. Again for reasons of funding, SLiCA's target population did not include Yupik traditional settlement regions in Alaska nor the indigenous groups occupying the vast territory between Russia's Kola Peninsula and Chukotka. For ease of reference we refer to SLiCA results as pertaining to Arctic Inuit people; please keep in mind that technically the results do not include all Arctic Inuit people and do include Chukotka indigenous peoples other than Inuit.

Response rates exceeded 80 percent in all regions (see Table 1). We did observe a bias in favor of female respondents that we addressed as a final sampling weight.

Results for Arctic indigenous settlement regions as a whole are subject to a maximum estimated sampling error of plus or minus one percentage point. Regional comparisons have sampling errors of one to four percentage points. Breakdowns for subpopulations and more refined geography are subject to larger sampling errors.

Interviews were conducted face-to-face. Statistics Canada was responsible for field work and data processing in Canada. The average interview length was 60 min in Canada (using a shorter questionnaire) and 90 min elsewhere. Interview data for Alaska, Greenland, and Chukotka were separately coded and processed using the Statistical Package for the Social Sciences

Table 1 Sample Summary

Indigenous settlement region	Indigenous adults	Sample size	Response rate (%)	Maximum estimated sampling error (plus or minus %s)
Northern Alaska	11,000	700	84	4
Chukotka	14,000	600	85	4
Canada	22,000	4,700	83	1
Greenland	36,000	1,250	83	3
Indigenous Settlement Regions	83,000	7,250	83	1

(SPSS). Due to the involvement of Statistics Canada, Canadian data is subject to the Canadian Privacy Act. Application of the provisions of this act requires the research team to merge the Canadian data with that of the other three regions within secure analysis laboratories in Canada.

The 90 min interviews produced 950 variables per respondent. Thus one observation record in the raw data file consists of 950 variables and there are 7,200 observations. A combination of scheduling differences and length of interview resulted in a more limited Canadian data set. The 950 variables in the international data set were used to produce 398 analytic variables. The Canadian data set includes 129 of these 398 analytic variables. We therefore report some results without Canadian comparisons.

An important analytic feature of the data file is that it is possible to test hypotheses about relationships among variables. We may hypothesize that income is related to education, for example. We can use the observed level of covariation between income and education to test the null hypothesis that there is no relationship between education and income. While an observed covariation does not prove that higher education leads to increased income, it lends support to the hypothesis. Since all the variables in a single observation are linked, it is possible to test multivariate hypotheses as well.

Overview of the Population

Seventy-six percent of the population represented by SLiCA is Inuit, including all indigenous peoples represented in Canada, Greenland, and Alaska. Chukchi residing in Chukotka constitute 18 percent of the population represented by SLiCA while Evan, Chuvan, and Yukagir together represent

the remaining six percent of the SLiCA population. Throughout this paper we refer to the combined indigenous population represented by SLiCA as Inuit adults.

One-in-two households have a school age child in the household while one-in-three households have a person 60 or over living there. Almost three-in-four households (73 percent) have four or fewer members. Only13 percent of households overall have six or more members, although more than a third of Alaska Iñupiat settlement region households (37 percent) have at least six members.

International Analysis Themes

SLiCA's indigenous partners developed five analysis themes. The idea behind all the themes is that many people making decisions that affect living conditions in the Arctic have misperceptions about life in the Arctic. SLiCA partners asked analysis questions directed toward the goal of increasing understanding about ways of life in Arctic communities. The analysis themes are:

- The importance of a mixed cash- and harvest/herding- based economy to living in the Arctic.
- The importance of social relationships and the standard of living to settlement patterns
- Relationships between social problems and other dimensions of living conditions
- The influence of educators and missionaries
- The influence of policies on living conditions

The Importance of a Mixed Economy to Living in the Arctic

Four decades ago, as wage work rapidly became more common in the north, scientists and policy makers assumed that indigenous people would take advantage of opportunities to participate in the cash economy, abandoning harvest and traditional food processing activities (Graburn 1969; Applebaum 1984; Usher and Wenzel 1987). In 1987 Wolfe and Walker advanced the concept of a mixed economy to describe an economy based on both wage employment and hunting, fishing, and gathering (Wolfe and Walker 1987). In a paper describing the conceptual development of measures of a mixed economy, Usher and his colleagues note that there is a substantial literature documenting the prevalence of mixed economies in the north, but

that the literature consists largely of case studies involving no more than a few communities (Usher et al 2003:197). SLiCA provides an opportunity to examine the prevalence of the concept of a mixed economy on a broad geographic scale.

The structure of the mixed economy differs by country. In Alaska, most products of hunting, fishing, and gathering do not enter the market economy. Rather, subsistence products are directly consumed by the harvesting household, given away, or exchanged. Cash plays an important role in the Alaska mixed economy however. Money buys snow machines, gas, and ammunition. The time spent in wage work may conflict with time that otherwise would be spent harvesting subsistence resources. In Greenland, in contrast, licensed professional hunters account for a large portion of the harvest of traditional foods. Households purchase these products in local open-air markets or processed in supermarkets. Greenlandic households are, with some restrictions, also allowed to hunt and fish for the consumption of their own household. Despite differences in the structure of the mixed economy, there are measures of the extent to which the components of a mixed economy are present in the Arctic.

We measure the cash generating component primarily with measures of employment and income. We measure the subsistence component primarily with measures of harvesting, herding, gathering, and processing activities, and with measures of the amount of traditional foods harvested and consumed. With these measures we can examine the extent to which households and individuals participate in the mixed economy.

Starting at the individual level, Table 2 shows the percentage of indigenous adults participating in 25 different hunting, herding, gathering, processing, or indigenous art activities in a twelve month period. The mean number of activities per adult (excluding Canada) is 7.3. The differences between countries are significant but not large. Hunting, herding, gathering, processing, or indigenous art activities constitute part of the lives of the vast majority of Arctic Inuit people.

At least six out of ten Inuit adults have worked in the reference week (the week prior to the interview). Table 3 also shows that 81 percent of Inuit adults worked for pay at least part of the year. Most Arctic Inuit participate in the wage economy.

To get an idea of the extent to which individuals participate in the mixed economy, we can compare the mean number of hunting, herding, gathering, processing, or indigenous art activities by wage work status (see Table 4). With the exception of Chukotka, indigenous adults who worked for pay in the last year participated in as many subsistence activities as those adults who did not work, but who are able to do so.

Table 2 Participation in Subsistence Activities by Country

	Canada	Greenland	Chukotka	Northern Alaska	Total
Fish in last 12 months	69%	69%	88%	77%	74%
Pick berries in last 12 months	*	71%	73%	70%	71%
Preserve meat or fish in last 12 months	*	55%	86%	74%	67%
Prepare or pack for hunting, fishing, camping trip	73%	44%	84%	71%	63%
Make and repair equipment or do household repairs	48%	73%	64%	51%	62%
Maintain a household camp	*	40%	92%	46%	56%
Gather greens, roots or other plants in last 12 months	*	*	45%	53%	48%
Hunt seal or ugruk in last 12 months	*	*		42%	43%
Hunt waterfowl in last 12 months	59%	40%	26%	44%	43%
Hunt caribou, moose or sheep in last 12 months	*	35%	21%	53%	34%
Hunt sea mammals	*	43%	6%		31%
Help whaling crews by cooking, giving money or supplies, cutting meat in last 12 months	*	*	29%	33%	30%
Gather eggs in last 12 months	*	19%	31%	40%	26%
Make sleds or boats in last 12 months	*	17%	43%	23%	25%
Skinned and butchered a caribou in last 12 months	*	*	44%	53%	25%
Manufacturer Native crafts for own use	*	20%	26%	37%	24%
Sew skins, make parkas and kamiks in last 12 months	*	17%	37%	24%	24%
Member of whaling crew or herded reindeer in last 12 months	*	*	14%	30%	21%
Hunt walrus in last 12 months	*	*		21%	21%

Table 2 (continued)

	Canada	Greenland	Chukotka	Northern Alaska	Total
Make native handicrafts in last 12 months	*	12%	15%	36%	17%
Sold meat fish or berries	*	10%	23%	7%	13%
Manufacturer Native crafts for sale	18%	7%	12%	23%	13%
Trap in last 12 months	11%	4%	15%	11%	9%
Growing crops	*	7%	6%	*	7%
Estimated Total	22,090	35,240	17,527	10,547	85,404
Mean number of seven subsistence activities in common with Canada:	2.7	2.8	3.2	3.5	3.0
Mean number of 25 subsistence activities: ANOVA $p = 0.000$	*	6.5	7.9	8.9	7.3

*Data not available.

Table 3 Summary of work status by country

	Canada	Greenland	Chukotka	Northern Alaska	Total
Worked last week	58%	67%	66%	50%	63%
Worked full time in last year but not in last week	20%	6%	15%	10%	12%
Worked part time in last year but not in last week	10%	7%	7%	15%	8%
Did not work last year - probably unemployed	6%	6%	6%	8%	6%
Not in labor force due to health, family responsibilities, or in school	0%	4%	3%	3%	3%
65 or older	6%	9%	3%	14%	8%
	100%	100%	100%	100%	100%
Estimated total	18,100	37,391	19,042	10,787	85,320
Chi Square $p = 0.000$					

Table 4 Mean number of subsistence activities by wage work status

	Canada	Greenland	Chukotka	Northern Alaska	Total
Worked last week	2.9	3.0	3.1	3.8	3.1
Worked full time in last year but not in last week	2.9	3.2	3.7	3.5	3.3
Worked part time in last year but not in last week	2.6	2.7	2.8	3.5	2.9
Did not work last year – probably unemployed	2.7	2.4	3.2	2.9	2.7
Not in labor force due to health or family responsibilities	*	2.1	1.8	2.8	2.2
65 or older	2.5	2.0	2.2	2.1	1.0
Estimated Total	22,100	37,392	16,255	10,786	86,533
ANOVA $p = 0.000$					

*Data not available.

A similar lack of relationship between wage work and subsistence activities can be seen by comparing total personal income[3] with the number of subsistence activities (see Fig. 2).

Looking at the perceived share of meat and fish consumed by the household that is traditional food there is again no evidence of a relationship between subsistence and income (see Fig. 3, $p = 0.02$).

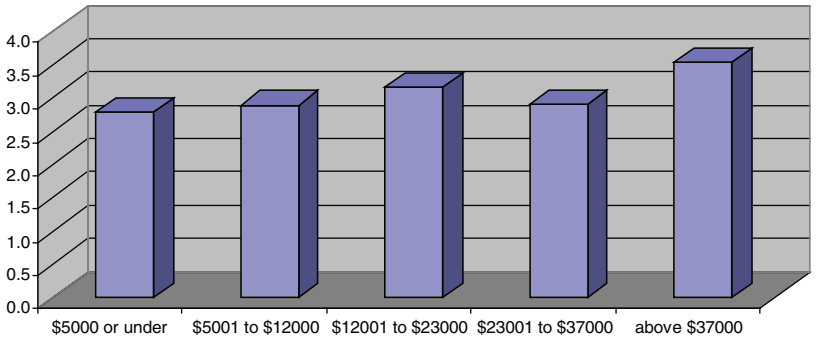

Fig. 2 Mean number of subsistence activities by total personal income adjusted for purchasing power

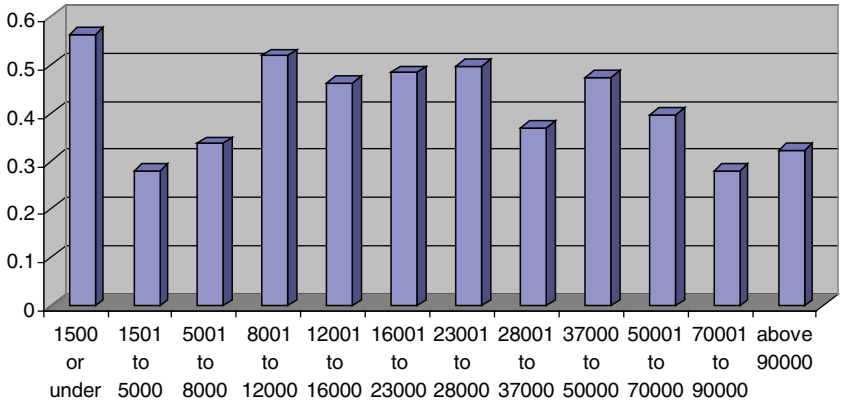

Fig. 3 Percentage adults perceiving that more than half of meat and fish consumed by household is traditional food by household income, adjusted for purchasing power

One nuance in understanding the role of the mixed economy is differences in stated preferences by gender and nationality. Unfortunately, results are not available for Canada. Table 5 shows that there are significant differences (note that the question on preferred lifestyle was asked differently in Greenland, as it included a category: self-employment; though asked, none

Table 5 Lifestyle preference by gender and country

	Male (%)	Female (%)	Total (%)
Greenland			
Working on a wage job	49	66	56
Harvesting, herding or processing own food	36	22	30
Self-employment	16	12	14
	100	100	100
Chukotka			
Working on a wage job	33	45	39
Harvesting, herding or processing own food	39	26	32
Both	28	29	29
	100	100	100
Northern Alaska			
Working on a wage job	13	18	15
Harvesting, herding or processing own food	7	9	8
Both	80	73	77
	100	100	100
ChiSq p = 0.000			

of the Greenlandic Inuit preferred a combination of lifestyles). Women in Greenland and Chukotka are more likely than men to prefer working on a wage job over harvesting, herding or processing their own food. Men and women in Greenland are more likely than their counterparts in Chukotka or Alaska to prefer wage work. In Alaska, gender differences almost disappear in the preferences for lifestyle. And for some reason, almost 8 in 10 Alaska Natives see a combination of working on a wage job and harvesting, herding or processing their own food as the most attractive lifestyle. We think this may be because the structure of Alaska's mixed economy makes it easier and more rewarding to do both. The North Slope Borough's policy of granting subsistence leave is one example. More subtle but perhaps as important is the respect given to hunters who also have full time jobs.

The Importance of Social Relationships and the Standard of Living to Settlement Patterns

Settlement patterns vary across the Arctic. Table 6 shows that in Greenland, most indigenous people (age 15 and above) live in cities (places with populations over 10,000) or towns (places with populations between 1,000 and 7,000). In Chukotka and northern Alaska, most live in villages with populations less than 1,000. In Canada, most indigenous people live in towns. How does living in a village compare to living in cities and towns?

Table 7 compares villages to towns and cities. Table 7 shows that in all countries: people who live in villages perform more subsistence activities and are more likely to be fluent in their native language. In towns and cities, people have higher levels of formal education, and more likely to be employed, and report slightly higher levels of social support. People in communities of all sizes report strong family ties.

Table 6 Arctic settlement patterns

	Canada (%)	Greenland*(%)	Chukotka (%)	Northern Alaska (%)
Villages/settlements	19	21	58	68
Towns	81	53	26	32
City/Capital		26	16	
	100	100	100	100

*Greenland normally distinguishes between settlements and towns. Using this definition, the distribution between settlements and towns (excluding Nuuk) in Greenland would be 18% and 56% respectively.

Table 7 Summary comparisons of Villages, Towns, and Cities

	Canada		Greenland		Chukotka		Northern Alaska	
	Village/ Settlements	Towns & Cities	Village/ Settlements	Towns & Cities	Village/ Settlements	Towns & Cities	Village/ Settlements	Towns & Cities
Number of children in household	1.6	1.2	1.3	0.9	1.3	1.1	2	1.6
Mean-index of native language (max = 20)	17.2	15.6	18.4	17.7	13.7	12.5	11.2	10
Mean - 5 subsistence activities	2.8	2.3	3.1	2.7	3.3	2.7	3.5	2.9
% adults with a vocational or college education	14%	50%	19%	54%	39%	50%	19%	34%
% of adults with job past 12 months	46%	58%	58%	77%	71%	76%	70%	79%
Mean-index strength of family ties (max = 3)	2.3	2.3	2.1	2	2	1.9	2.2	2.3
Mean-index availability of social supports (max = 28)	21.8	23.1	21	22.5	18.7	17.5	20.8	22.5

Table 8 Considered moving in last five years by place size & country

	Towns & Cities (%)	Villages, settlements (%)	Total (%)
Canada	31	28	29
Greenland	35	38	36
Chukotka	28	30	29
Northern Alaska	49	38	42

Before we started the project people were asking, 'Why do people continue to remain in communities with poor housing conditions and a low material standard of living'? Our data show that most people (68 percent) are satisfied or very satisfied with the quality of life in their community, and when we asked people if over the past five years they had considered moving away from their community, about two thirds replied that they had not considered moving. Most people want to stay in their communities, but there are differences among countries. Inuit people in northern Canada are the least likely to want to move away (29 percent). In Greenland 36 percent have considered moving, Chukotka, 29 percent, and in northern Alaska 42 percent. Table 8 shows that Alaska Inuit who live in cities and towns are more likely to want to move than people who live in villages; in other countries there is very little difference.

Our data show that material living conditions are important for settlement patterns. They also show that family ties and social support are important for understanding why people live where they do. We asked people why they moved to their community and why they remain in their community. People who want to move out of villages say they want to move for a job, or children's education[4]. People wanting to move out of towns report that they want to move because of the high cost of living (perhaps indicating they want to move to a big city), or to be near family (possibly indicating they want to move to a village). More than any other reason, people say they stay in their communities because of family. This is especially true in villages. In regional centers, people also cite jobs as a reason for staying.

Relationships Between Social Problems and Other Dimensions of Living Conditions

Our Native partners recognize that social problems like suicide are more pronounced in the north. They also feel that public discussion of these problems is often negative. They encouraged the research team to look at social

Table 9 Percentage of adults perceiving of social problems for indigenous people in their community

	Canada	Greenland	Chukotka	Alaska	Total
Unemployment	87%	84%	100%	83%	88%
Alcohol abuse	78%	79%	100%	84%	84%
Suicide	70%	67%	97%	60%	74%
Drug abuse	79%	68%	72%	71%	72%
Family violence	69%	63%	91%	50%	69%
Sexual abuse	60%	58%	87%	34%	62%
Estimated Total	16,870	37,026	20,456	10,393	84,745

problems in the context of other living conditions. We started by verifying what indigenous peoples see as social problems facing their community. With one exception, half or more of indigenous adults in the sampled regions of Alaska, Canada, Chukotka and all of Greenland see unemployment, alcohol abuse, drug abuse suicide, family violence, and sexual abuse as social problems (see Table 9).

Social problems are usually publicly recognized aggregates of individual problems.

The individual problems SLiCA measures include: thoughts of suicide, depression, victimization, and alcohol and drug abuse. Here we focus on the relationship of suicide and depression to other living conditions. As Table 10 shows, eight percent of indigenous adults considered suicide in the last year, with little variation by country. Using a five item scale predicting likelihood of being seriously depressed (Berwick et al 1991), 13 percent of Inuit adults are likely depressed. There is a large variation by country, with 29 percent of Chukotka indigenous adults likely depressed compared with six percent of Canadian Inuit adults.

It is important to keep in mind that our measure of depression is not a clinical diagnosis and, while the questions making up the scale were asked during a self-administered portion of the interview and sealed by the respondent in an envelope before given the completed form back to the interviewer,

Table 10 Percentage of adults experiencing individual problems

	Canada	Greenland	Chukotka	Alaska	Total
Most likely depressed	6%	13%	20%	8%	12%
Considered suicide in last year	*	8%	6%	6%	7%
Estimated Total	19,550	37,401	14,790	9,309	81,050

*Data not available.

the setting in which the questions were applied was not a clinical setting. In part to validate the measure of depression, we can test for its relationship to thoughts of suicide. Inuit adults who score as likely being depressed are more than twice as likely as other Inuit adults to have considered suicide in the last year (15 percent versus 6 percent, excluding Canada where the question on thoughts of suicide was not asked).

To place the individual problems of depression and suicide in the context of other living conditions, we first want to test whether depression and satisfaction with life as a whole are related. If so, then examining key relationships with well-being may suggest ways to influence the likelihood of depression, and in turn thoughts of suicide. Forty-three percent of Inuit adults who are satisfied with their life as a whole are least likely depressed compared with ten percent of Inuit adults who are dissatisfied with their life as a whole (see Table 11).

We of course cannot prove that increasing well-being will reduce the likelihood of depression, but the data support this as a working hypothesis. What else is related to the likelihood of depression? We tested hypotheses that social support, alcohol problems in the home, self-rated overall health, and being a victim of assault are related to the likelihood of being depressed. Inuit adults with higher levels of social support (e.g. frequent access to people they can count on for advice) and who do not have alcohol problems in their home are significantly less likely to be depressed. Together, life satisfaction, alcohol problems in the home and health explain four percent of the variation in depression scores, with life satisfaction and health being most important.

We then hypothesized that people who are more active in productive activities are more likely to be satisfied with their lives as a whole. The choice

Table 11 Likelihood of being depressed by satisfaction with life as a whole*

	Dissatisfied (%)	Neither satisfied nor dissatisfied (%)	Satisfied (%)
Most likely depressed			
(score 1–14)	11	6	7
(score 15–19)	26	23	20
(score 20–25)	53	40	30
Least likely depressed			
(score 26–30)	10	31	43
	100	100	100
ChiSq p = 0.000			

Data based on Alaska and Greenland (scale constructed according to Berwick and Donald 1991)

of focusing on productive activities is predicated on the idea that there are ways to help people become more productive. Inuit adults who receive a poverty level personal income (60 percent or less of the median income in their indigenous settlement region) are less likely to be very satisfied with their life as a whole than adults who receive higher personal incomes (32 versus 43 percent)[5]. But at higher levels of personal income, the level of income is not always associated with higher likelihood of being very satisfied with life as a whole. We also found that people who work full time during at least part of the year are more likely to be very satisfied with life as a whole as people who were likely unemployed (35 versus 18 percent). Those who are more active in subsistence are also more likely to be satisfied with life as a whole. Forty-four percent of the most active in subsistence (12–22 activities) are very satisfied with their life as a whole compared with 30 percent of the least active (0–2 activities).

We tested the combined explanatory power of personal income, subsistence activities along with satisfaction with the combination of productive activities. Each variable significantly contributes to the explanation of variation in life satisfaction. We then tested two additional variables: satisfaction with the amount of fish and game available locally, and satisfaction with the number of job opportunities in the community. These each added their own contribution to explaining life satisfaction, tripling the percentage of variation explained from six to 18 percent. Finally, we hypothesized that the sense of local control is important to well-being and subject to policy intervention. Adding an index of influence based on three questions concerning satisfaction with the influence of indigenous people over the management of natural resources and local environmental problems modestly increases our ability to explain life satisfaction.

Our model explaining overall life satisfaction could be considerably more complete by taking into account other factors such as health, education, transportation, and recreation services, and housing. The point to be made here is that productive activities, the presence of production opportunities (i.e. fish and game, jobs), and a sense of local control are associated with satisfaction with life as a whole. How might we foster improvements in these factors and ultimately hope to reduce the incidence of depression and thoughts of suicide?

Not surprisingly, a good way to improve cash production is formal education. Inuit adults with a high school degree earn on average 49 percent more than Inuit who did not complete high school. Inuit completing a college education earn on average 47 percent more than Inuit with a high school education. Perhaps it should not be a surprise either that the same relationship works in subsistence. The number of traditional skills learned as a child

Table 12 Satisfaction with influence over the management of natural resources like fish, game, petroleum and mining, and over reduction of local environmental problems

	Greenland	North Slope	Northwest Arctic	Bering Straits	Chukotka	Total
very satisfied	1%	22%	12%	9%	1%	3%
somewhat satisfied	27%	44%	39%	26%	3%	23%
neither satisfied nor dissatisfied	38%	21%	29%	33%	13%	30%
somewhat dissatisfied	20%	11%	15%	22%	35%	23%
very dissatisfied	15%	2%	5%	10%	48%	22%
	100%	100%	100%	100%	100%	100%

(Scale based on three items)

explains 29 percent of the variation in the number of subsistence activities pursued in the last year. Both formal and traditional education contribute to production activities that in turn contribute to overall well-being.

How do we increase the sense of local control? SLiCA results are provocative in this regard. We hypothesized that greater regional autonomy is related to a greater sense of local control. We ordered SLiCA study regions based on our own judgment of relative autonomy, listing Greenland at the top and Chukotka at the bottom. We ordered the three Alaska Iñupiat settlement regions based on access to economic resources from the North Slope first, Northwest Arctic second, and Bering Straits region third. We do not have SLiCA results from Canada on perceived influence. Our hypothesis is supported by the data shown in Table 12 with the striking exception of Greenland. The North Slope of Alaska appears to be a success story; the Iñupiat there were successful in forming a regional government funded through taxation of petroleum facilities. They have effectively used their access to economic resources to influence such bodies as the International Whaling Commission and to manage development. The Greenland results invite discussion but it seems obvious that there was change in the political discourse[6] since the introduction of Home Rule Government in 1979 towards a common vision of an independent Greenland through the expansion of self-governance. This discourse has focused on political domains lacking influence.

The Influence of Educators and Missionaries

During the pretest phase of SLiCA the international team discovered a remarkable similarity in the stories told by Saami in Norway, Iñupiat in

Table 13 Percent attending at least part of schooling outside community by country

	Canada	Greenland	Chukotka	Alaska	Total
Elementary School	1%	48%	35%	28%	31%
High School	1%	13%	50%	44%	22%
Estimated Total	22,320	39,117	20,714	10,898	93,049
ChisSq p = 0.000					

Alaska, and Inuit in Canada and Greenland. They talked about having to leave their community to go to school. In fact, going away to school has been quite common (see Table 13).

The stories we heard suggested that going away to school was often stressful. The results regarding elementary school differ by country. About the same percentage of Greenland Inuit found attending elementary away from their community stressful as those who attended elementary school at home (see Table 14). In Chukotka and Alaska, attending elementary school away from home was substantially more likely to be stressful. But even at home the experience could be stressful. One Alaska Iñupiat reported, "There was a conscious effort to punish students who used Iñupiaq language and a conscious effort to separate students from parents. We had a black board in a class of 4th, 5th, and 6th graders. If one child spoke Iñupiaq, the teacher

Table 14 Adults with stressful experiences in elementary and/or high school

		Attended at least part of elementary school away from community	Attended elementary school at home	Total
Greenland	Elementary school stressful	25%	21%	23%
Chukotka	Elementary school stressful	69%	28%	40%
Alaska	Elementary school stressful	39%	15%	22%
		Attended at least part of high school away from community	Attended high school at home	Total
Chukotka	High school stressful	39%	31%	36%
Alaska	High school stressful	34%	21%	28%

Chi Sq p = 0.000 except Greenland, P = 0.02.

would put on the wall a bull's-eye and all the students would be forced to stare at the center for 30 min to 2 h."

We don't have data from Greenland regarding stress in high school. The differences in Chukotka and Alaska of being away in high school are less than that for elementary school, but still exist. Stress can come at home as well as away from home. One Alaska Iñupiat told us, "You know what formed in high school, the different cliques, the different groups - the cheerleaders, the smart ones, the losers. I had friends who were higher status and friends who were losers. I struggled with this with my son. He hates school. My husband wants him to go elsewhere. I wish I had the opportunity. So we're leaning toward Mt. Edgecombe [a boarding school]. It's stressful and something I have to deal with through my son."

Another aspect of education important to Arctic indigenous peoples is the integration of their culture with the educational system. The level of integration has changed markedly within living memory. It also differs substantially by country. In Greenland, for example, since at least the early 20th century some of the teachers or teachers' aides have been Greenlanders, the Greenlandic language has been taught in schools, and subjects have been taught in Greenlandic (see Table 15). Most Greenland Inuit were taught about Greenlandic culture and history, although less than half of Greenland Inuit think what they were taught was usually accurate.

In both Chukotka and Alaska, the presence of indigenous teachers or teacher's aides in elementary or high school classes has increased over the lifetimes of the oldest residents, as has indigenous language instruction and coursework in indigenous culture and history. About a third of Chukotka indigenous people and two-thirds of Alaska Inuit think that what they were taught about indigenous culture and history was usually accurate. Overall, the integration of indigenous culture in the Arctic education system has substantially improved, but there is apparently a long way to go, particularly in meeting Inuit standards for the accuracy of information about their own culture and history.

Another story to be told is about the effects of missionaries in the Arctic. It is a complicated story and mostly must wait for further coding of open-ended responses and analysis. We can begin by stating that virtually all Greenlandic Inuit consider themselves to be Christians, as do eight in ten Alaska Inuit and one-in-two Chukotka indigenous adults. At the same time three-in-four Alaska and Chukotka indigenous adults and one-in-two Greenland Inuit think that indigenous beliefs are part of their life. Put another way, one-in-two Arctic Inuit consider themselves a Christian and think that indigenous beliefs are part of their life.

People bring a lifetime of experience to the question of the effects of organized religion on their community. Some focus on the early negative effects:

Table 15 Indigenous culture in education by age and Country

	15/16–24	25–34	35–44	45–54	55 and over	All adults
Some teachers or teachers aides indigenous in elementary or high school						
Canada	83%	83%	63%	27%	38%	66%
Greenland	100%	98%	98%	100%	99%	99%
Chukotka	98%	86%	90%	54%	68%	81%
Alaska	94%	92%	72%	57%	46%	72%
Taught indigenous language in elementary or high school						
Canada	83%	83%	63%	27%	41%	67%
Greenland	100%	99%	96%	99%	99%	98%
Chukotka	91%	79%	70%	50%	57%	69%
Alaska	91%	95%	56%	18%	6%	52%
Taught some subjects in indigenous language in elementary or high school						
Canada	82%	83%	62%	25%	36%	66%
Greenland	100%	96%	96%	99%	99%	98%
Chukotka	19%	7%	3%	6%	17%	8%
Alaska	80%	79%	54%	19%	19%	50%
Taught about indigenous culture and history in elementary or high school						
Canada	83%	83%	63%	29%	41%	67%
Greenland	86%	90%	92%	91%	79%	88%
Chukotka	60%	18%	14%	17%	12%	22%
Alaska	90%	88%	63%	28%	17%	57%
Information taught about indigenous culture and history usually accurate						
Canada	65%	70%	67%	55%	58%	66%
Greenland	18%	32%	37%	40%	52%	37%
Chukotka	36%	5%	29%	31%	39%	27%
Alaska	58%	77%	64%	61%	80%	66%
Estimated Total	10,153	10,576	13,234	9,920	6,791	50,674

"It's had a devastating effect. It purposely robbed people of their rights to traditional spiritual practices." Others remember the difficult time during which missionaries arrived: "This village was established with a church. Everybody came here starving. [The Bureau of Indian Affairs] provided Quakers to 'straighten' them out. People came here to get saved." Still others bring a more current focus. Here are two examples of answers to the question of effects of organized religion on the community: (1) "When you go to church - if you're ill you go to a doctor - for your spirit you go to church. For your inner peace and calmness to tackle the world church gives you assurance that you can make it in the world."; and, (2) "Some good and some bad. The good is that it gives people that inner belief. The bad is that the church often dictates what's good for the community, what the community can and can't do."

The Influence of Policies on Living Conditions

SLiCA results gain meaning in the context of decision making. Local villages face decisions about what is taught in their community schools, or how to handle teens troubled by thoughts of suicide. Regional institutions face decisions on how to design employment and housing programs. National institutions face decisions about making major investments in community infrastructure. International bodies like the Arctic Council face decisions about how to promote sustainable development. SLiCA results obviously don't identify the best decisions to make; they can, however, inform decision making. One way in which SLiCA results can inform decision making is by broadening comparisons. Only 8 percent of Canadian Inuit have been diagnosed with high blood pressure, for example, in comparison to 27 percent of Alaska Inuit. Apartment living is common in Greenland and Chukotka (19 percent and 14 percent of homes respectively are multiple family buildings). Yet 59 percent of Greenland Inuit living in multiple family dwellings feel drafts from doors and windows compared with 74 percent of Chukotka indigenous people.

Larissa Abryutina of the Russian Association for Indigenous Peoples of the North initiated an analysis of health indicators relevant to decision makers. She found that Chukotka Indigenous people are more than twice as likely as Arctic Indigenous in Greenland or Alaska to have three or more symptoms of health problems. Chukotka indigenous people are five times less likely to have a doctor or other medical professional in their community. They consume less meat and fish that is traditional food. Diet and health are related. Chukotka Indigenous adults who eat less traditional food are more likely to have three or more diagnosed health conditions as those whose traditional food constitutes more than half the meat and fish they eat.

Arctic Human Development Report (AHDR) – an Arctic Council supported project concludes on gender violence that "There is a need to analyse men's changing roles in society and how this affects social problems such as suicide and violence towards others. Violence against women has been identified as a significant problem in the Arctic and has been attributed in part to male loss of identity and self-worth, societal tension as well as issues of power and control" (AHDR 2004).

As a part of her PhD study Mariekathrine Poppel is including some of the questions related to violence:

- Violence as a problem in local community
- Whether the respondent has been a victim to sexual assault or other assault.
- Assault includes domestic violence as well as violence outside respondents' home (e.g. street, restaurant etc.)

The SLiCA findings (see Table 9) seem to give a clear answer to the question whether violence is a concern in the Arctic as more than two out of three Inuit perceive violence is a problem in the local community – the highest percentage among Inuit in Chukotka and the lowest in Alaska. When all Inuit are considered, 20% more women than men find that violence is a problem.

Violence is often related to alcohol abuse, and it is common to see alcohol as the main reason for violence including domestic violence (see Table 16). Table 16 does not tell us about causal relationships but it shows that persons with alcohol or drug problems in their home more often are victims of assaults (other than sexual assaults) than persons without these problems: roughly twice as often in Greenland and Chukotka and three times as often in Alaska.

Furthermore, and still without claiming causality: to investigate if there might be support for a hypothesis of social heredity when it comes to alcohol related problems, the relationship between having faced alcohol and drug problems at home today and in childhood has been examined. A preliminary finding is that among the people facing alcohol problems in their home today the group that experienced alcohol problems in their home as a child compared to the ones that did not is three times higher in Greenland, nine times higher in Chukotka and 2½ times higher in Alaska.

Another topic to be further researched is whether violence is related to income. The first tests show that distributing the victims of assault among the households by income there seem to be a decreasing percentage of victims with increasing income (only the lowest income group does not fit into this pattern).

Table 16 Problems with alcohol or drugs in home today and victims of (other than sexual) assaults during last 12 months – Inuit in Greenland and Alaska age 15 and above

	Victim of another type of assault during past 12 months	Problems with alcohol or drugs in home today		
		No (%)	Yes (%)	Total (%)
Greenland	yes	8	14	9
	no	92	86	91
		100	100	100
Chukotka	yes	10	21	15
	no	90	79	85
		100	100	100
Alaska	yes	3	16	8
	no	97	84	92
	Total	100	100	100

Larissa Abryutina's and Mariekathrine Poppel's work illustrates the potential relevance of SLiCA results to informed policy decision making. Much more work remains to be done by other researchers. To support this effort, the SLiCA research team is collaborating with the Institute for Social Research at the University of Michigan and Computer-assisted Survey Methods Program (CSM) at the University of California, Berkeley to develop a means by which the highly dispersed Arctic policy community can access and analyze SLiCA microdata via the web without risking inadvertent disclosure of respondent identity.

Lessons Learned About the Process of International & Indigenous Collaboration

SLiCA is obviously not the first international, comparative survey of living conditions. Many others, such as the European Values Study[7], the Eurobarometer[8], and the European Social Survey[9] have had to confront the challenges of maintaining a consistent meaning across languages, trading off quality of measurement against response burden, and raising the necessary funds. What may be distinct about SLiCA is its intent that a multidisciplinary group of social scientists and indigenous people work together to redefine and measure living conditions in a region spanning 30 degrees of latitude around the globe. What was the process and how did it work?

Prior to SLiCA the research team was aware that the checkered history of social science research among indigenous peoples of the North had caused indigenous people to question the benefits of research. Indigenous people and the research team also recognized the unequal distribution of power between researchers who came with money and expertise and indigenous people who possess an in-depth traditional and local knowledge of their environment not easily expressed in the world of science. National teams tried to compensate for this imbalance by forming indigenous steering committees. In Alaska, for example, the team invited indigenous representatives from Iñupiat regional organizations to come together and decide if the proposed research could be structured to benefit indigenous peoples. Their affirmative answer was predicated on the research team's commitment to give the indigenous steering committee, the Alaska Native Management Board, the final say on the questionnaire and an opportunity to comment on draft publications resulting from the study.

The researchers initially underestimated the potential contribution of our indigenous partners. They began with the idea that the research team would bring completed work products (e.g. a pretest questionnaire) to the indigenous steering committee for discussion and approval. The research

team developed these initial work products in workshops based on the preparatory work of the national/regional steering committees without direct indigenous participation. Soon, however, our indigenous partners challenged the research team to directly involve indigenous representatives in the workshops. This proved to be an outstanding success. Not only did the indigenous representatives add a valuable perspective based on their traditional knowledge and on-the-ground experience; they also were able to step back from the, at times, arcane academic discussions and bring the entire group back to a productive focus.

The direction received by the indigenous steering committees improved the science and focused the study on questions intended to benefit the well-being of indigenous Arctic peoples. When the team explained the collaboration to outsiders, some voiced fears that the indigenous steering committees would hijack the science for other purposes. On the contrary, our indigenous partners were as motivated as the research team to produce high quality results.

How well did the anthropologists, economists, political scientists, sociologists, ethnographers, and geographers work together? Perhaps most telling was a decision taken at the first, joint international meeting held in Slagelse, Denmark. The disciplinary makeup of national teams differed. We could either try, at great expense, to duplicate expertise in each national team, or we could trust that we could work as an international team. Despite the fact that many of us were just becoming acquainted, we decided on the latter approach. This collaboration across disciplines and countries proved to strengthen the study as a whole, causing members to bring their expertise to bear in new environments. Seeing first hand how such things as the organization of labor (e.g. whaling crews, reindeer herders) and sample frames differed between countries helped the team to identify potential problems that could threaten the validity of the study as a whole. In short, transcending national team thinking greatly benefited the study as a whole.

The Statistics Greenland team decided to invite Statistics Canada's Special Surveys Division to prepare a feasibility study for the Canadian component of the study (Statistics Canada 1998). Stat Can methodologists worked with research team members from other countries to build a common understanding of underlying assumptions and associated costs. As a result, national research designs converged to a much more realistic approach than initially envisioned.

Where we failed to transcend national thinking was in the area of funding. The Greenland team was successful in securing support for international team workshops from the Nordic Council of Ministers. This support was absolutely critical. The international team decided that primary funding for

each country's contribution to questionnaire development, fieldwork, analysis, and publication would come from national funding sources. We did not pay sufficient attention to differences in national funding priorities, nor did we help each other enough in the development of national proposals. There was no international science plan that could serve as a guide to national review panels.

Differences in funding success by country produced differences in schedule that in turn increased study costs and affected the comparability of results. In Canada, our indigenous partners suggested that SLiCA could be implemented in conjunction with Statistics Canada's Aboriginal People's Survey (APS). Stat Can agreed, and ultimately contributed three million dollars US to the Canadian component of SLiCA in in-kind research support. Stat Can worked with SLiCA researchers and indigenous peoples' representatives to design APS questionnaire components. Unfortunately, the schedule for APS preceded funding of SLiCA in many countries and therefore completion of the SLiCA international core questionnaire. As a result of schedule differences and tradeoffs Stat Can had to make between comparability with SLiCA and other APS objectives, only about a third of the SLiCA international core measures are contained in APS. Recoding of APS data to fit the international data set also proved to be a major task, involving over 6,000 lines of computer code and hundreds of hours of labor. The lesson here is not to avoid piggybacking one survey on another, but rather to take into account all the costs. We cannot reliably predict what different decisions we would have made. Perhaps, though, knowledge of the costs would have expedited the team's decisions on the content of the core questionnaire.

Perhaps the biggest lesson was the length of time it took for questionnaire development: three years. Had all countries had their funding in place at the onset of questionnaire development, we doubtless could have accelerated the questionnaire process. But there was also a good reason for such a protracted questionnaire development effort. At our first meeting our anthropologist team members were extremely skeptical that structured questions could produce valid measures of such concepts as cultural identity or even herding and harvesting production systems. Had the team members sharing a more quantitative bent pushed ahead without extended discussions and pretesting, we probably would have lost a sense of common ownership of the study approach. As it was, the major compromise took the form of an intent to complement the structured interviews with in-depth qualitative studies. Huge difficulties in obtaining funding for the structured interview component displaced this commitment to become a future research priority. Nevertheless, the SLiCA questionnaire evolved to a form that reflected the multi-disciplinary makeup of the team and of direct indigenous involvement.

While far from perfect, the questionnaire reflects the study's intent to measure living conditions in a way relevant to Arctic indigenous peoples.

SLiCA: Where Next?

In March 2007 the international team conducted an international workshop to discuss SLICA results and to announce a comprehensive release of results (see www.arcticlivingconditions.org). SLICA results are now being used by the international research community and Arctic indigenous representatives to help design an Arctic Social Indicators system under the auspices of the Arctic Council.

Notes

1. www.arcticlivingconditions.org
2. In Greenland and Canada
3. Personal incomes are adjusted for purchasing power using national PPP figures. In general Arctic regions have lower purchasing power than the nation of which they are a part. The major effect of adjusting for purchasing power is to increase Chukotka Russia incomes by a factor of almost five.
4. The dataset contains responses for Chukotka, northern Alaska and Canada.
5. It should be noted though, and this is to be further investigated, that there might be regional variation in how satisfied people should be to rate themselves "very satisfied". A hypothesis is that the inclination to use the Greenlandic word for "very" might be smaller than using "very" in English.
6. In 2003 a Commission on Self-Governance presented a report re-evaluating Greenland's position within the Danish Realm. Following this report a joint Danish-Greenlandic Commission on Self-Governance was established to propose further development on the jurisdiction of the Greenland Home Rule.
7. See www.gesis.org/eurobarometer
8. www.europeansocialsurvey.org
9. www.europeanvalues.nl

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