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The Registered Indian Human Development Indices: Conceptual and Methodological Issues

Martin Cooke

Introduction

The Registered Indian Human Development Index (HDI) and Community Well-Being Index (CWB) were developed by researchers at Indian and Northern Affairs Canada to provide an ongoing indication of progress made in improving the health and well-being of Aboriginal peoples in Canada. In that sense, they are in the tradition of the social indicators movement that began in the late 1960s, and which has generated a wide variety of composite indicators that attempt to measure various aspects of social, economic, physical, psychological, environmental, and spiritual well-being. As we have been careful to make clear in the papers that form the basis for several chapters in this book, none of these indicators are perfect. Each must balance various methodological and conceptual considerations, and all represent some choices about what constitutes “well-being,” “quality of life,” “human development,” or any of the other descriptions of the preferred conditions in which people live. All make some compromise between conceptual completeness and ease of interpretation and calculation, between ideal measures and available data, and between applicability to the local context and validity for broad national or international comparisons.

Despite the inherent shortcomings of any quantitative social indicator, we obviously feel that the ones we have chosen are appropriate, and have the potential to inform policy debates. Nonetheless, it is important to acknowledge the limitations of our measures, while trying to draw attention to what we believe are their strengths and advantages over alternative approaches. This chapter discusses the conceptual and methodological issues and choices that are involved in our adaptation of some of the UNDP’s Human Development Indicators to examine well-being among Aboriginal populations in Canada. I first describe the aims of the HDI and CWB indicators and their general form. I then present a number of other indicators, some that are internationally applied and others that have been applied only to specific contexts, in order to situate the indicators in this book within the broader range of social indicators, and to frame a discussion of the various methodological considerations. I conclude by summarizing the limitations of these measures, as well as their strengths.

The Development of the Registered Indian and Inuit Human Development Index

It comes as no surprise that Aboriginal peoples in Canada have lower average incomes, educations, and employment rates, as well as poorer health than other Canadians, and there has been a lot of economic, social, political, and health research aimed at documenting these disparities and uncovering the mechanisms behind Aboriginal disadvantage. Over the past several decades there have been any number of important changes in the political situation of Aboriginal peoples and in the policies and programmes implemented in and by Aboriginal communities that have attempted, successfully or not, to address these inequalities. These have taken place against a background of far-reaching demographic, social, and economic changes in Canadian society. This complexity makes it rather difficult to answer the simple question, *are things getting better?*

The answer to that question, of course, depends on the indicators chosen and the time period over which they are examined. Our work on this series of indicators began in 1998, with the aim of creating a reliable and valid time series of measurements that address a broad conception of “well-being” or “quality of life,” and which would be available to identify progress into the future. These indicators would be used to answer the question of whether the disparities between Aboriginal people and other Canadians had indeed decreased, and by how much. These measures could also serve as potential dependent variables to be used in analyses that would identify the causal factors that have led to changes in these indicators. As well, we intended that these national and regional-level indicators would form the basis for more local measures that could identify communities that had particularly high levels of well-being, as well as those that faced the most challenges.

We took the United Nations’ Human Development Index (HDI) as a starting point for the development of these indicators, for reasons that will be discussed in the remainder of this chapter. Our first published application was an adaptation of the HDI to examine the differences in well-being between Registered Indians and other Canadians in 1996 (Beavon and Cooke, 2003). We called this adaptation the Registered Indian Human Development Index, and we used life expectancy estimates and Census data to compare HDI scores of Registered Indians on- and off-reserve to those of other Canadians, by province and region. We found, again to no surprise, important differences on the index, as well as important differences across regions within Canada. As part of this project, we also compared the HDI scores of Registered Indians living on- and off-reserve in 1996 to countries in the United Nations’s *Human Development Report*. Although not particularly important in terms of policy implications, we presented these comparisons in order to empirically address the question of whether First Nations people in Canada did live in “Third World conditions,” as was sometimes claimed. We found that indeed there were large gaps, but that conditions were comparable to countries

nearer to the middle of those in the *Human Development Report*, with “medium” levels of human development.

These measures were then used to investigate the changes in the relative well-being of Registered Indians over the period from 1981 to 2001 (Cooke, Beavon, and McHardy, 2004). This analysis found that indeed the average educational attainment, income, and life expectancy had increased, both on- and off-reserve. Despite this progress, considerable gaps remained between the Registered Indian population and other Canadians on the index. What was more surprising was that gaps on some indicators increased in some Census periods, as the improvements in the Registered Indian population did not keep up with those made by other Canadians. As part of that report, we looked at the trends in gender differences on the HDI indicators, and found that education and income of Registered Indian women had indeed improved between 1981 and 2001. However, progress in closing gender gaps in income was uneven, despite the fact that Registered Indian women were increasingly surpassing Registered Indian men in terms of education. The patterns that we found are presented in Chapter 4 of this volume, along with some supplemental measures and analysis.

The Community Well-Being Index (CWB) is an adaptation of the general HDI methodology to the community level (O’Sullivan and McHardy, 2005). Using Census data, it measures labour force participation and employment, income, housing, and education within communities. Research using the CWB has included mapping and geographic analyses to help understand the role of remoteness and isolation in producing community outcomes, as well as comparisons between First Nations and other Canadian communities with the CWB indicators, which are presented in Chapter 8 of this volume. The HDI and CWB measures have also been used to examine the well-being of other populations, within Canada and internationally. Senécal et al have applied these measures to Inuit populations and communities, the results of which are in Chapter 7.

The Registered Indian HDI and CWB are part of a tradition of social indicators research that has produced a number of useful indices and scales, as well as some that are less practical. In the following section, I present an array of other indicators for comparison, and the rationale behind their development. This is not nearly a complete list, but includes some of the most cited ones, as well as the one other indicator that has been developed in the context of Aboriginal populations.

Social Indicators and the Social Indicators Movement

Social indicators, including the HDI, were developed in order to balance what was seen as an over-emphasis on economic measures in the determination of progress or “development.” Gross Domestic Product (GDP) or employment levels are informative, but, it was argued, address only one dimension of human well-being. In the late 1960s and early 1970s, the time at which the development of many of

these social indicators began, purely economic approaches to development had come to be viewed with some suspicion, particularly by those who saw the growth in human economic and industrial activity as at odds with the natural environment, and therefore unsustainable. Concerns about crime and social conflict in developed countries, environmental degradation, as well as the slow progress of development in many parts of the world led to a search for indicators that captured more of the totality of human life. Some of the more ambitious social indicators researchers sought to create a system of measures that would compliment the *national accounts* data collected by most countries. These social accounting frameworks would be used to measure whether “real” progress was being made, or whether economic growth was being pursued at the cost of social and economic conditions (Michalos, 2003: 5).

After the initial interest, work on the development of social indicators waned somewhat, but there was a revival in the early 1990s. Since then, many different composite indices and scales have been developed, incorporating a wide variety of social, economic, and environmental measurements. Some of them are quite complex, while others are fairly simple. Below, twelve of these more recently developed indicators, including the UNDP’s Human Development Index and the Registered Indian HDI and CWB, are discussed. These include several specifically Canadian measures, and one that has been developed specifically for use with Indigenous populations in Australia.

The UNDP’s Human Development Index (HDI)

The United Nations Development Programme made a major contribution to the development of composite indicators with the publication of the first Human Development Report in 1990. This report contained a new indicator, the Human Development Index (HDI), which captured three dimensions of the development process; income, health, and knowledge, in a single indicator (UNDP, 1990). The HDI was a response to the previous emphasis on GDP growth in studies of international development, and the recognition that high national product does not necessarily translate into high average standards of living, particularly if income is not equitably distributed, or investments are made in military expansion instead of health and social infrastructure (Rao, 1991).

The UNDP conceives “human development” as an expansion of choices, made possible by knowledge, material standard of living, and a long and healthy life (UNDP, 1990). The HDI measures countries’ progress toward various maximum values on literacy and education, life expectancy at birth, as well as per capita GDP, and publishes a league table ranking countries based on their HDI score. Canada’s high ranking, leading the list of countries with “high human development” for most of the 1990s, became a point of pride for some Canadian politicians, despite the fact that there is very little difference in the HDI scores of the most developed countries.

Figure 2.1: Equations

$$\text{Equation 1} \quad I_{Index} = \frac{X_{actual} - X_{min}}{X_{max} - X_{min}}$$

$$\text{Equation 2} \quad I_{HDI} = \frac{\left[I_{LEB} + \left(\frac{2}{3} I_{LIT} + \frac{1}{3} I_{GER} \right) + I_{GDP} \right]}{3}$$

$$\text{Equation 3} \quad I_{GDP} = \frac{\log y - \log y_{min}}{\log y_{max} - \log y_{min}}$$

The HDI is a composite of three sub-indices; an Income Index, an Education Index, and a Life Expectancy Index, each with equal weight in the overall HDI. The life expectancy index and the income index are calculated from single indicators, life expectancy at birth and per capita national product. The education index is composed of two indicators, adult literacy and gross enrolment rates. The general formula for each indicator is shown in **Equation 1 (Figure 2.1)**.

In this way, the sub-indices describe the distance from the theoretical maximum and minimum values, given for 1999 in **Table 2.1** (page 30), as set by the UNDP. Literacy is given a two-thirds weight within the education index, and enrolment a one-third weight. The HDI is simply the arithmetic mean of the Income, Education, and Life Expectancy indices.

The UNDP methodology uses per capita GDP, expressed in Purchasing Power Parity Dollars (PPP\$), as a proxy for income, which itself is taken to be a measure of the people's ability to satisfy their basic material needs. The use of per capita GDP is partly due to the difficulty in gathering average annual income data in many developing countries (UNDP, 1999: 128–9). In the calculation of the Income Index, GDP is heavily discounted in order to reflect the decreasing marginal utility of income, the assumption that a given increase will have a larger impact on the lives of those with less income. The logarithmic discounting formula is shown in **Equation 3 (Figure 2.1)**, in which y is per capita GDP and (y_{min}) and (y_{max}) are the minimum and maximum income values, expressed in PPP\$.

The simplicity of the HDI is offset to some degree by the inclusion of many other statistics in the annual *Human Development Report*. Since 1990, the UNDP has refined some of these measures in its annual reports, and has developed supplementary measures, such as the Gender Development Index and the Gender Empowerment Measure, in response to criticisms that the HDI was not sensitive to gender differences (UNDP, 1995).

Table 2.1: Components, Minimum, and Maximum Values for the HDI and CWB Indices

Indicator	Minimum Value	Maximum Value
UNDP HDI Indicators		
Life expectancy at birth	25 years	85 years
Adult literacy	0%	100%
Combined enrolment ratio	0%	100%
GDP per capita	PPP\$100	PPP\$40,000
Registered Indian HDI Indicators		
Life expectancy at birth	25 years	85 years
Proportion 15+ with grade 9 or higher	0.0	1.0
Proportion 20+ with high school or higher	0.0	1.0
Per capita total annual income	CDN\$100	CDN\$40,000
Community Well-being (CWB) Indicators		
Proportion 15+ with grade 9 or higher	0.0	1.0
Proportion 20+ with high school or higher	0.0	1.0
Labour force participation age 20 and older	0.0	0.8895
Employment as proportion of labour force	0.0	1.0
Per capita total annual income	CDN\$2,000	CDN\$40,000
Proportion of the population with no more than one person per room	0.0	1.0
Proportion of the population living in residences with no need of major repairs	0.0	1.0

The Registered Indian Human Development Index

Calculating a Human Development Index score for the Registered Indian population requires data that are regularly produced and form a reliable time series, and which allow comparison to other Canadian populations. They also need to distinguish between on- and off- reserve residence and be available by province or region to be useful for the types of analyses we had planned.

These requirements limit the sources of data for education and income characteristics to the Census. Life expectancy estimates for the general Canadian population are generated regularly by Statistics Canada using vital statistics data, and the Indian Register is used to produce estimates for the Registered Indian population, as part of projections for the Registered Indian population.

Whereas the UNDP's HDI uses adult literacy and enrolment rates, these measures are not available from Census data. Instead, we use the proportion of the 15 and older population with grade 9 or higher education as a proxy for adult literacy, the measure of the "stock" of basic education in the population. As a measure of higher education, and which is more sensitive to the "flow" of education in to the population, we use the proportion of the population aged 20 and older, which has completed high school, or some technical or community college, or some university.

Per capita GDP, the income measure in the UNDP indices, is replaced in the Registered Indian HDI by a measure of average annual income from all sources. However, whereas Statistics Canada generally reports this measure as averaged for the population 15 and over and with income, we use the average for the total population with and without income, to account for the higher proportion of children and others without income in the Registered Indian population.

These three components are combined in the Registered Indian HDI index using the same procedure and weighting as in the UNDP's HDI. We also use the same maximum and minimum values as the UNDP's HDI (**Table 2.1**), although average income is adjusted using Statistics Canada's Consumer Price Index (Statistics Canada, 2005a).

The Community Well-being Index (CWB)

The CWB (McHardy and O'Sullivan, 2004) combines elements of the HDI, which is applied at a national and provincial/regional level, and elements of the community-level analyses by Armstrong (2001). The dimensions of well-being included in the CWB are education, labour force participation and employment, income, and housing. These indicators are derived from the Census, which provides information at the Census Subdivision (CSD) level, which allows identification of individual reserves and other Aboriginal communities. These measures combined to form an index score for each community, roughly following the methodology of the HDI, with each individual indicator scaled to reflect the difference between a theoretical minimum and maximum.

The CWB contains the two indicators for education from the Registered Indian HDI. It also includes two measures pertaining to labour force activity and paid work in a community. The first is labour force participation in the week prior to the Census, by those aged 20 and over. However, this variable is re-scaled, so that the upper limit is not the 1.0, or 100% labour force participation, an impossible and perhaps undesirable target. Rather, the authors set 0.8895, two standard deviations above the average Census Subdivision (CSD) labour force participation rate in 2001, as the maximum. The second labour force measure is the proportion of the total labour force that was employed in the week prior to the Census. In order to avoid unduly penalizing communities for school enrolment, the denominator for this measure includes only those aged 20 and older. These labour force participation and employment measures are given equal weight within the labour force activity component of the CWB.

The CWB also includes average income per capita. As in the HDI, \$40,000 is used as the theoretical maximum (**Table 2.1**). However, whereas the UNDP uses PPP\$100 as the minimum value for per capita GDP, the CWB uses CDN \$2,000 as a more realistic minimum average annual income in the Canadian context (McHardy and O'Sullivan, 2004: 7, Chapter 6 in this volume).

In addition to education, labour force activity, and income, the CWB includes two indicators pertaining to housing, a particularly important issue in First Nations

Table 2.2: Key Characteristics of Selected Composite Indicators

	Number of Dimensions		Number of Indicators		Sources of Data			Weighting of Concepts			Income Scaling	
					Census	Administrative	Other	Equally Weighted	Theoretical	Empirical	Income Logged	Income Linear
Registered Indian Human Development Index (HDI)	3		4		•	•		•			•	
Community Well-being Index (CWB)	4		6		•			•			•	
UNDP Human Development Index (HDI)	3		4			•		•			•	
Weighted Index of Social Progress	10		40		•	•						•
Quality of Life Index (QOL)	7		7			•	•	•		•		•
Prescott-Allen's Indices of the Well-being of Nations	10		87		•	•			•			•
Conference Board of Canada's Quality of Life Scorecard	5		24		•	•	•	•				•
Genuine Progress Indicator *	9		27		•	•	•	•			-	-
Fordham Index of Social Health (ISH)	4		16		•	•	•	•				•
Fraser Institute Index of Living Standards	8		8			•	•	•				•
Ontario Social Development Quality of Life Index	4		12			•	•	•			-	-
Index of Relative Indigenous Socioeconomic Disadvantage	4		4		•					•	-	-

1. The Ontario Social Development Quality of Life Index and the Index of Relative Indigenous Socioeconomic Disadvantage include income in the form of a poverty rate.

* The Genuine Progress Indicator uses personal consumption, rather than income, and discounts this by the Gini coefficient.

communities. Housing quantity is measured by the proportion of the population living in dwellings with no more than one person per room. Housing quality is measured by the proportion of the population that reported in the Census that their dwellings were not in need of major repairs. Both of these indicators are given equal weight in the housing component.

Other Socio-economic Indicators of Well-being

As described above, the UNDP's HDI and our own Registered Indian HDI and CWB are two of many different composite social indicators, each with a different conception of well-being or "quality of life." Below, I briefly present some of these alternative measures, in order to situate our own indicators within this field. Some of their key characteristics are summarized in **Table 2.2**.

The Weighted Index of Social Progress (WISP)

The WISP was developed by Richard Estes (1997) of the University of Pennsylvania, as an improvement on his *Index of Social Progress* (Estes, 1984). The new index uses statistically-derived weights and 46 indicators in 10 sub-indices to identify changes in the "adequacy of social provision" in countries throughout the world since 1970. The sub-indices include education, health status, women's status, defence effort, economy, demography, geography, political participation, cultural diversity, and welfare effort.

Quality of Life Index (QOL)

The QOL (Diener, 1995) was developed to include "subjective" or value-based elements of the quality of life, as well as the "objective" measures of physical health and economic activity (Diener and Suh, 1997). The measures chosen represent three "universal requirements of human existence"; biological needs, coordinated social interaction, and the survival and welfare needs of groups. The QOL also uses different indicators for developed and developing countries, in order to account for their substantially different social and economic contexts. Following Schwartz (1994), Diener identifies seven "value regions," each of which is measured by a separate indicator. These regions and their indicators for developed countries are mastery (physicians per capita), affective autonomy (subjective well-being), intellectual autonomy (college/university attendance), egalitarian commitment (income equality), harmony (major environmental treaties), conservatism (monetary savings rate), and hierarchy (per capita income). These components contribute equally to the "total quality of life," which is an average of the scores on these variables.

Prescott-Allen's Indices of The Well-being of Nations

The indices of *The Well-being of Nations* were developed by Robert Prescott-Allen (2001), and focus on sustainable development with the central idea that an index of economic and social well-being must also include the environmental

costs of human activity. *The Well-being of Nations* report assesses sustainability in 180 countries using a 36-indicator Human Wellness Index and a 51-indicator Ecosystem Well-being Index. The intersection of the two provides a country's overall well-being index, with the ideal of both high human and ecosystem well-being.

Conference Board of Canada's Quality of Life Scorecard

Since 1986, the Conference Board of Canada has annually compared Canada to other Organisation of Economic Co-operation and Development (OECD) countries based on their performance in six categories: economy, innovation, environment, education and skills, health, and social development with the Quality of Life Scorecard. In the 2002 report these are measured by 24 indicators, including income, crime, the availability of social programmes, the confidence of foreign investors, and air and water quality (Conference board of Canada, 2002).

The Genuine Progress Indicator (GPI)

The Genuine Progress Indicator (GPI) was developed by San Francisco-based research and policy organization Redefining Progress to measure social, environmental, and economic well-being of the US by adjusting per capita GDP to account for other variables. The basic idea of the GPI is that economic expansion is not progress if it comes at a high cost to social life and the environment.

The GPI is built upon consumer expenditures, which are then adjusted for inequality in the distribution of goods and income, the rate of depreciation in durable goods, and expenses due to crime and social problems, as well as costs associated with underemployment and pollution. The estimated value of non-market work, such as child care and volunteer work, is added to GDP. The GPI also considers the long-term cost of dependence on fossil fuels, and the loss of wetlands, forests, and farmland (Cobb, Goodman, and Kliejunas, 2000; Sharpe, 1999).

Fordham Index of Social Health (ISH)

The Index of Social Health (ISH) was developed at Fordham University's Institute for Innovation in Social Policy (Miringoff and Miringoff, 1999) to measure social health trends in the US. There are 16 indicators in this index, dealing with health, mortality, inequality, and access to services. Different indicators are used to monitor social health in different life cycle stages. Infant mortality, child abuse, child poverty, teen suicides, drug abuse, and high school dropout rates are included for children and youth. Unemployment, weekly earnings, and health insurance coverage focus on the well-being of adults. The social health of the elderly is measured by the poverty rate and cost of health care for those 65 and older. Homicide and alcohol-related traffic fatality rates, and access to housing, income inequality, and food stamp coverage apply to all ages. Brink and Zeesman (1997)

have produced a modified version for Canada, which uses the rate of social assistance use, rather than food stamp coverage.

Fraser Institute Index of Living Standards

Economist Christopher Sarlo has developed this exploratory index for the Fraser Institute, to follow changes in the quality of life of Canadians over time. This index includes per capita consumption and income, the poverty rate, an index of household facilities, post-secondary education, unemployment, life expectancy, and networth per capita. These are equally weighted and calculated from Census and other data (Sarlo, 1998).

Ontario Social Development Quality of Life Index

The Ontario Social Development Quality of Life Index was developed in 1998 by the Ontario Social Development Council (Shookner, 1998). It was designed as a community development tool which would monitor key indicators of quality of life in Ontario on four dimensions; social, health, economy, and the environment. Social indicators include the number of social assistance recipients and children in the care of Children's Aid societies, as well as public housing waiting lists. Economic indicators include the number of people who are employed and unemployed, and bankruptcies. The 12 indicators are given equal weights, and there is no separate income indicator.

The Index of Relative Indigenous Socioeconomic Disadvantage

Researchers at the Centre for Aboriginal Economic Policy Research at Australian National University have developed the only other composite index to be specifically applied to Aboriginal populations (Gray and Auld, 2000). The Index of Relative Indigenous Socioeconomic Disadvantage includes indicators of income, the proportion of the population below the poverty line, an indicator of housing quality, the proportion of the population with secondary school qualification, and the proportion of the population employed. The authors apply the index to Aboriginal and Torres Strait Islander Commission regions in Australia, using 1991 and 1996 census data.

Comparing Indicators: Methodological Considerations

There has been a lot written about the methodological issues in developing these kinds of measures. Indeed, there are social science journals devoted to them. In the space allotted here, we will review some of the larger conceptual and methodological issues, particularly the ones that have led to criticisms of our own approach, or which figured prominently in the choices we have made.

Conceptual Issues: Dimensions of Well-being

The first question, and the one that is at the heart of the development of these indicators, is just what dimensions of well-being are important to measure in a given context. To some degree, this is a normative question about what constitutes the “good life,” and which we cannot hope to address here. We can see that among the indicators briefly described above, some include a very large number of separate dimensions, addressing economic, physical, environmental, spiritual, subjective, and social well-being. Clearly, all of these dimensions are important to human happiness or quality of life, and most of the criticisms of the relatively smaller indices, such as the HDI, are that they omit important dimensions of well-being (e.g. Veenhoven, 1996). On the other hand, indices have also been criticized for including dimensions with too much conceptual or empirical overlap. McGilivray (1991) has criticised the HDI on the grounds that the HDI and GDP per capita are highly correlated, and that adding the dimensions of education and life expectancy do not significantly improve our ability to identify countries in which conditions are improving, and those in which progress is more elusive. Alternatively, Ogwang and Abdou (2003) find justification from principle component analysis for using only life expectancy at birth to rank nations, and omitting the other HDI measures.

The choice of the dimensions to include is obviously limited by the availability of data. In the case of the Registered Indian HDI and CWB, the data limitations are discussed below, but it is worth mentioning them here, in relation to the choice of dimensions. One of the reasons for the relative simplicity of the UNDP’s HDI is its use in the context of developing countries, many with relatively limited national statistics systems. For example, although including environmental degradation is important in the international context, the comparability of these indicators over time may be compromised by changes in the availability of data. Environmental measures are certainly an important aspect of the quality of life, and this may be more so the case for Aboriginal peoples than other Canadians, given historical, spiritual, and economic connections to the physical environment. At the same time, for the Registered Indian HDI, which is mainly about comparing the well-being of populations, rather than geographic regions, measures of environmental health are not applicable. Important aspects of the physical environment, such as air quality, defy identification with a particular location or region. For community-level measures, such as the CWB, it might be possible to include some measures of the environment, such as water quality. Many of those measures are not easily available, however, and would require special data collection. The CWB does include a measure of housing quality and quantity, perhaps one of the most important aspects of the very local physical environment that affects human well-being. However, at this point we have not incorporated the health of the natural environment as a dimension of these measures.

One of the major problems with some of the dimensions included in some of these indices is their subjectivity. Diener’s Quality of Life Index, for example,

has a specific focus on subjective measures of well-being, and he has elsewhere sought to construct an “index of happiness” (Diener, 2000). Veenhoven (1996) has proposed a happiness-adjusted life expectancy measure. However, we believe including such subjective indicators in these indices is ill-advised, even if data were available. The cultural specificity of something like “happiness” would put any comparisons between Aboriginal peoples and other Canadians on shaky theoretical ground. Other subjective aspects of life such as autonomy (Diener, 1995) are also too difficult to include, and defy definition and measurement. We have therefore chosen to include only the dimensions that are more or less objectively measurable in the HDI and CWB.

We are aware that we have omitted aspects of life that may be particularly important to Aboriginal peoples, including access to traditional lands and activities and retention of Aboriginal languages, and we have been criticized on this point (Salée, 2005; Ten Fingers, 2005). Spirituality and traditional cultural activities are clearly important to many Aboriginal people, as they are to many non-Aboriginal Canadians. There is evidence that retention of culture has beneficial effects for other aspects of well-being, including education and health outcomes (eg. Chandler and Lalonde, 1998). However, measuring cultural retention is difficult, to say the least. We take cultural activities and language retention as factors which very likely improve social, psychological, and physical well-being, rather than as dimensions of this well-being themselves (O’Sullivan, 2003).

We have also not included some objective measures that are included in other indices. Rates of crime and violence, included in the Fordham Index, are not included in the Registered Indian HDI or CWB. We know that Aboriginal peoples are disproportionately victims of crime, as well as disproportionately incarcerated (Brzozowski, Taylor-Butts, and Johnson, 2006). However, these results come from General Social Survey (GSS) data, the only source of data about victimization that also includes questions about Aboriginal identity or Registered Indian Status. Crime report statistics generally do not include this information, and the GSS, like most Statistics Canada Surveys, is not administered in reserve communities. This, and the lack of an ongoing source of time-series data, makes it impractical to incorporate victimization into the Registered Indian HDI. Crime report data do show that crime rates are higher in reserve communities than in other communities (Brzozowski, Taylor-Butts, and Johnson, 2006), raising the possibility that one could include some measures of crime report into a community-level index. However, in small communities we can expect only a few reports of crime in any given year. The effect of this on annual rates is the same as that of community death rates on life expectancy—there will be dramatic fluctuations between years, making any conclusions about trends in community well-being highly suspect.

Some of the indices described in the preceding pages, such as the Conference Board of Canada’s Scorecard, include measures of social spending as a positive measure of quality of life. Others, such as the GPI, include measures of military spending, higher values of which are presumed to reflect a lower quality of life.

These measures are untenable for comparing populations within a single state, such as comparing Registered Indians and other Canadians using the HDI, or for community-level measures such as the CWB. However, there are more important reasons for avoiding expenditures as a dimension of well-being in these indicators. Choices about expenditures do indeed have implications for well-being. However, the direction of these effects is often unclear. For example, The Ontario Social Development Quality of Life Index and Brink and Zeesman's (1997) application of the Fordham index include rates of social assistance and health care provided to the elderly as negative indicators of social well-being. However, these are determined to a great extent by availability and eligibility, and the range of services covered. Cuts in benefit eligibility would result in an instant increase in measured well-being (Michalos, 2003: 31). This is a problem with many of the indicators that are included in the larger indices described above.

Within the Canadian context, research and debate about program design, funding levels, and implementation is obviously an important focus for policy research, and part of the rationale behind these indicators is to identify what policies, programmes, and approaches seem to "work" to improve standards of living. In our previous work, we have examined the correlation between HDI scores for Registered Indians on-reserve and the level of spending on DIAND programs (Cooke et al., 2004). However, as with cultural retention and cultural activities, we consider spending levels to be important factors influencing well-being, rather than indicators.

Clearly, our choices about the dimensions to include in the HDI and the CWB are limited by the available data. Nonetheless, we think that there are also some good theoretical reasons behind the UNDP's choice of including just three dimensions; health, income, and education, as well as practical reasons. Health, measured in the HDI by life expectancy at birth, is affected by accidents and homicides that are included as separate measures in some of the other indices. Similarly, income, which is included in the HDI as a measure of material standard of living captures the effects of unemployment, including reliance on social assistance or transfer payments, which are included separately in other indices.

In the end, the Registered Indian HDI and CWB do not include as many dimensions of "well-being" as some of the other indices presented here. However, the ones that are included are also widely represented among the other indices. **Table 2.3** (page 42) shows the degree to which the HDI and CWB dimensions are also captured by the other indices, indicating a general agreement that these dimensions are important, even if other indicators are much more inclusive. However, the question of the conceptual definition of well-being is different from the question of measurement and calculation.

The Calculation of the HDI and CWB Indicators

Any single dimension of "well-being" in a composite index can be measured many ways, using different sources of data. The indicators presented above also

use different schemes for combining individual indicators into a composite index and for assigning weights. Below, I discuss some of the issues related to the data sources, the selection of measures, and the combining of measures into the HDI and CWB.

Data Quality and Availability, and Comparability Over Time

Comparability and availability over time are among the major considerations that lead some to prefer indices which have fewer, rather than more, indicators. This has been particularly important in the case of developing countries, where, with even the relatively few indicators included in the *Human Development Report* there are inevitably problems with definitions, and data collection has changed from year to year. **Table 2.2** (page 32) shows the sources of data used in each of the indicators presented here. For many, administrative and national accounts data are used. These include domestic and national product estimates, as well as the mortality rates used to calculate life expectancy. Some, such as the CWB and the Index of Relative Indigenous Socioeconomic Disadvantage, use census data, while others use sample surveys.

One of the goals of the HDI and CWB was to compare Registered Indian populations and other Canadians populations. As described above, although Canada collects a great deal of vital statistics, few of these data contain identifiers of Aboriginality or Registered Indian Status, or on- or off-reserve residence. Most sample surveys with content covering the domains included in the CWB and HDI—such as the Labour Force Survey (Statistics Canada 2005b), which is the usual source of data on the Canadian labour force—do not collect data from reserve communities. The 1991, 2001, and 2006 post-censal Aboriginal Peoples Surveys (APS) would seem promising for the construction of these indicators, but the 2001 APS sample is not considered to be representative of the on-reserve population¹ (Statistics Canada, 2005c). Regardless, the APS surveys collect data *only* for those identifying themselves as Aboriginal, and do not allow comparison to other Canadian populations or communities. There is also no guarantee of the continuation of these surveys, casting doubt on their ability to provide time series data.

Nonetheless, there are problems with the Census as a source of data for the income, education, labour force participation, and housing indicators in the HDI and CWB. There have been some problems and changes to the question used to establish who is a Registered Indian in the Census, as well as to the legal definition of Registered Indian status, that may confound any observed changes in the characteristics of this population between census years. In 1981, Registered Indian status was determined by the Census Ethnic Origin question, which included “Status Indian” and “Non-Status Indian” as possible responses (Statistics Canada, 1982). The 1986 Census included a new question about Aboriginal ethnicity. It asked, “Do you consider yourself an Aboriginal person or a Native Indian of North America, that is, Inuit, North American Indian, or Métis?” (Statistics

Canada, 1987). Possible responses to this question included “Status or Registered Indian” and “non-status Indian,” as well as other single and multiple responses. In the 1986 Census, problems were identified with the so-called “identity question,” requiring estimates using a cross-classification of the identity and residency questions. Because of this, the 1986 Registered Indian population may not be strictly comparable to the 1981 population (Laroque and Gauvin, 1989). In later Censuses, a question that asked directly if the respondent was registered under the *Indian Act* was used, and was separate from the ethnicity question (Statistics Canada, 1992).

Also, in 1985 Bill C-31, the *Act to Amend the Indian Act*, resulted in the registration of Aboriginal women who had lost their claim to status through out-marriage, and their children, as well as others who may have lost their claim to status through military service, or other stipulations of the Act. This amendment resulted in the reinstatement of over 114,000 people by 1999, increasing the Registered Indian population considerably. These C-31 registrants are predominantly women, many of who continue to live off-reserve, and who may differ from other Registered Indians in terms of education, income, and health status. Their addition to the Registered Indian population will have affected the characteristics of this population to some degree (Clatworthy, 2003).

An additional consideration is that there have been changing patterns of ethnic identification among Canadians, as seen in the Census. Guimond (2003) has found that the “identity” population, the population of Canadians who identify themselves as members of an Aboriginal group, has grown because of an increased tendency of Canadians to identify themselves as such. This has mainly occurred amongst those self-identifying as Métis or non-status First Nations people. However, the census data also rely on self-report of Registration Status, and as such, there may be a similar increased tendency for people to report being Registered Indians.

Finally, in each Census, a number of reserve communities do not participate, with the number fluctuating with each Census, and there is also some amount of undercoverage on- and off-reserve (Guimond, Kerr, and Beaujot, 2004: 65–66). The existing data are re-weighted to account for nonresponse, but it is possible that these changes will also affect the estimated socio-economic composition and health status of that population.

In Canada, vital statistics systems do not record Aboriginal identity when registering births or deaths. As a result, estimating life expectancy for Aboriginal populations for use in the HDI is very difficult. One of the only sources of appropriate data for constructing age-specific mortality rates is the Indian Register, the list of Canadians registered under the *Indian Act* (Rowe and Norris, 1985; Nault, Chen, George, and Norris, 1993; INAC, 2000). However, these data have some limitations as well. Separate estimates for provinces and regions, and by on- and off-reserve residence are not available for all years, and in some cases estimates must be interpolated. The Indian Register data also suffer from late and non-report of births and deaths, as described by Nault and colleagues (1993: 5)

likely resulting in overestimates of life expectancy. Lastly, the Indian Register data do not provide any information about the Inuit or other Aboriginal populations. Senécal and colleagues have had to overcome this by using an “ecological” approach in their application of the HDI to the Inuit.

Applicability of the Indicators to Aboriginal Populations

The question of applicability of the HDI and CWB indicators to Aboriginal populations is really a question of their validity. That is, do the various measures capture what they are supposed to measure? Although they may be appropriate for measuring the education and material well-being of non-Aboriginal Canadians, differences in Aboriginal populations may make these measures less applicable.

Average annual income, intended to measure material quality of life, considers only money income and does not capture the numerous other kinds of income that may be important. Residents of Aboriginal communities may benefit significantly from traditional activities, including trapping, hunting, and fishing, and the proceeds of these activities might be spread widely among family and friends. This and any other material that is exchanged outside of the money economy will not be measured. Furthermore, instrumental help such as help with child care and other caring activities can contribute significantly to one’s quality of life, and are not captured in these measures. The labour force participation measures in the CWB also capture only participation in the paid labour force, providing no information on productive activity outside of the formal economy. The education measures capture only education within the formal education system, missing the important learning that takes place informally, through spending time with elders and other older community members, and participating in traditional activities. The proxy for adult literacy, the proportion aged 15 and older with grade 9 or higher, is really only a proxy for literacy in one of Canada’s official languages and does not address knowledge of Aboriginal languages.

To the degree that informal work and education outside of the school system are more important in First Nations or other Aboriginal communities, these measures will under-estimate material well-being. Life expectancy at birth and the housing quality indicator in the CWB index are less problematic in this regard, and are probably equally valid in Aboriginal or non-Aboriginal contexts. Some well-being measures, such as the GPI, do include measures of non-market work, although these are not available from the Census. Although we recognize that there are aspects of education and income that are not captured in these measures, we nonetheless believe that these aspects of formal educational and labour force participation are important to measure, and do contribute to the quality of life for people and communities.

Sensitivity to Change: Stock and Flow Measures of Well-being

One of the considerations in choosing a measure is whether it is able to capture change resulting from policy interventions or external causes. Hagerty and

Table 2.3: Inclusion of the HDI and CWB Dimensions in Other Quality of Life Indices

	Income	Education	Labour Force Activity	Housing	Health Status
Human Development Index (HDI)	•	•			•
Community Well-being Index (CWB)	•	•	•	•	
Weighted Index of Social Progress (WISP)	•	•			•
Quality of Life Index (QOL)	•	•			•
Prescott-Allen's Indices of Well-being of Nations	•	•	•		•
Conference Board of Canada's Quality of Life Scorecard	•	•	•		•
Genuine Progress Indicator (GPI)	•			•	
Fordham Index of Social Health (ISH)	•	•	•	•	•
Fraser Institute Index of Living Standards	•	•	•	•	•
Ontario Social Development Quality of Life Index	•		•	•	•
Index of Relative Indigenous Socioeconomic Disadvantage	•	•	•	•	

colleagues (2001) refer to this as the “sensitivity” of an indicator. Some measures, such as per capita GDP as a proxy for average annual income, or average income measured using Census data, are inherently sensitive to year-to-year changes. On the other hand, measures of education, such as the proportion of the population with a high school education, reflect the “stock” of knowledge in a population, but are unlikely to change much between years, because those most likely to gain a high school education in a given year are those in a relatively limited age range. As a result, even programmes that dramatically reduce high school dropout rates are unlikely to be reflected in such a measure. The UNDP recognized this problem in the 1995 Human Development Report, in which the education component of the HDI was changed to include the adult literacy rate, reflecting the “stock” of education in a population, and the combined primary, secondary, and tertiary school enrolment ratios, reflecting the “flow” of education into a population.

Capturing both “stock” and “flow” is more important for some dimensions of well-being than others. It is similar to the importance of reporting both incidence and prevalence in order to understand the amount of disease in a population, but also the contribution made by new cases. Sensitivity is a weakness in many of the indicators reviewed here, particularly in the domains of education and envi-

ronmental impact. In the case of the CWB, the income, labour force, and housing measures are sensitive to changes between years. Although the education measures taken in the Registered Indian HDI and CWB are valid measures of the stock of knowledge and functional literacy in a population, they are not sensitive to annual changes. One way that the measure of the proportion with high school or higher education might be changed to reflect the flow of education into a community may be to limit the proportion to young adults, who are more likely to be involved in education or training. However, the overall proportion of a population with post-secondary qualifications remains an important indicator of the stock of human capital and knowledge in a community. Ultimately, sensitivity is only one consideration in the choice of indicators, and given that the income, labour force, and housing measures are inherently sensitive to changes between Census periods, including educational attainment as a “stock” variable represents a compromise.

Weighting and Scaling of the Components and Indicators

One of the most interesting questions is how each component of such an index should be weighted. **Table 2.2** (page 32) indicates which of three general approaches to weighting are taken in each of the indices. Some indices, such as the Quality of Life Index, and the Community Well-being Index weight each component of well-being equally. Prescott-Allen’s Indices for the Well-being of Nations gives indicators different weights, according to their theoretical importance to the concept being measured. The HDI and the CWB give equal weight to each dimension of the index, but weight each of the two education indicators differently. Following the UNDP, primary education is weighted most heavily, reflecting the theoretical importance of literacy as a fundamental prerequisite for social participation. Other indicators use statistical techniques, such as principal components analysis, to empirically determine weights for each indicator (Slotte, 1991). The components in the Index of Indigenous Socioeconomic Disadvantage and the WISP are weighted using this method.

Statistical methods for determining weights raise some questions. For example, if the aim is to compare the change of indicators over time, and the weights are re-calculated for each year, as in the Index of Relative Indigenous Socioeconomic Disadvantage, some of the change in index scores will be due to the different weighting, and some will be due to the changes in the indicator scores. With few indicators, the goal of examining change over time, and in the absence of a compelling theoretical reason to give some indicators more weight than others, the equal-weighting approach taken by most of these indices may be the best (Hopkins, 1991: 1471).

Another consideration is whether the indicators in an index will be re-scaled or transformed, or left in their original metrics. This is particularly important in the case of income, which is often considered to have decreasing marginal utility. At higher levels of income, the effects of each additional dollar on overall well-being are less, and this is reflected in indices such as the HDI, which has used a

logarithmic transformation of income since 1999 (UNDP, 1999). However, most of the indices that include income or its proxy, per capitaGDP, leave the measure untransformed (**Table 2.2** – page 32). Emes and Hahn (2001) argue that the HDI's log formula is arbitrary, and results in an under-valuation of the impact of income on human development, and particularly too low a score for the US.

Ultimately, such arguments for not discounting income are not more convincing than the decreasing marginal utility argument for the log formula, or other transformations. Indeed, the decision of the weighting of individual indicators and the ways in which these indicators might be transformed, are often value judgments, as are the components to be included in an index. For example, the discounting of GDP in the HDI has meant that Canada generally scores higher than the US on this index, whereas this would not be the case without the transformation. The important point is to be aware of the effects of these transformations and weights in interpretation. In the CWB index applied to First Nations and other Canadian communities, it will be the higher income non-First Nations communities whose income scores are most reduced by this formula and the differences between First Nations and other communities on the income indicator will therefore be affected more than the differences among First Nations.

There is no single answer to the methodological or conceptual problems encountered in creating a composite index of well-being. We believe that the decisions we have made in taking the UNDP HDI as a model have been reasonable, but accept that others will suggest alternatives. This is the case with the UNDP's measures as well, and they have nonetheless proved themselves to be useful in international and national policy discussions and research.

Conclusions: Measuring Well-being

This chapter has described the intentions behind the development of the HDI and CWB and their use in measuring the well-being of Aboriginal peoples in Canada, and places these measures within the context of other composite indicators of well-being. These are relatively simple measures, and capture relatively few of the many possible dimensions of well-being, due partly to the limited availability of data. However, these measures do allow comparison between Aboriginal and non-Aboriginal populations and communities and the construction reasonably reliable time series. This allows us to address one of our main questions, which is whether social and economic conditions have been improving for Aboriginal peoples in Canada. They will also allow us to undertake more analytical research, in order to identify the specific factors that influence well-being, and to identify “what works.”

As we have tried to emphasize here and in the other papers using these indices, it is recognized that these measures do not reflect the totality of well-being, and may particularly omit some aspects that are important to Aboriginal peoples. However, we feel that the dimensions that are captured; overall health, education,

and income in the HDI and labour force activity and housing quality in the CWB, are objectively important aspects of quality of life. Improvements in these indicators would reflect unambiguously positive advances in the conditions in which people live, and are worthy goals for policy.

Nonetheless, these are only partial measures of well-being. They provide a set of basic indicators of social and economic conditions and how they have changed over time. As with any set of qualitative social or economic measures, they need to be augmented and elaborated with other measures and observations in order to give a complete picture of the social and economic conditions of Aboriginal peoples in Canada. We do, however, believe these indicators give us important information about the changing social and economic conditions of Aboriginal peoples in Canada.

Endnotes

- 1 One can extract those persons living on-reserve and complete an analysis, but this raises other methodological issues that complicate comparability and representivity.

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