

**The First Nations Community Well-Being Index (CWB):
A Conceptual Review**

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1. Introduction

This paper provides a brief description and conceptual assessment of the Community Well-Being index (CWB), developed by researchers at Indian and Northern Affairs Canada (INAC) to measure the social and economic well-being in Canadian First Nations communities (McHardy and O'Sullivan, 2004). The CWB is a composite indicator, combining several dimensions of community well-being into a single index. It can be used to compare Aboriginal communities and non-Aboriginal communities, to develop trends over time, and to help identify correlates of well-being, including policies and programmes that improve social and economic conditions in communities. This paper first briefly discusses the history of composite indicators and presents ten indicators of well-being that can be compared to the CWB. The construction of the CWB is then described and compared to the other indices in terms of the dimensions of well-being included, the sources of data used, and the weighting and calculation of the index.

2. Composite Social Indicators

The field of composite social indicators began in international population and development studies in the 1970s, as an improvement on the use of gross domestic or national product to measure overall development. Although GDP is a generally valid proxy for average income, it was recognized that the concept did not capture either the degree to which income was distributed amongst populations, nor did it capture other important aspects of well-being or quality of life. In some countries with high or rising per capita GDP, it was clear that income remained inequitably distributed, and did not translate into better health or social outcomes (e.g. Miringhoff and Miringhoff, 1999: 26). Development policies and programmes thus began to consider social development in addition to economic growth as an important component of overall human development or improvement in well-being.

In response to the inadequacy of per capita income measures, many composite measures of social and economic well-being have been developed for use at the national and subnational levels. These indicators generally attempt to combine several important dimensions of well-being or quality of life into a single measure, which can then be compared between populations and across time. However, these indicators differ widely on the dimensions that are included as part of quality of life. Each must balance a desire to include the theoretically important dimensions of well-being with ease of calculation and the availability and comparability of data. Below, ten composite indicators, each with different components and methodologies, are briefly described for comparison with the CWB.

2.1 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 UNDP has since 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, which reflect the degree of women's inclusion in a society. Canada's high ranking, including 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. However, Aboriginal people have not experienced the same high levels of human development, according to a modified version of the index which compares Registered Indians in Canada to other Canadians, developed by the Strategic Research and Analysis Directorate of Indian and Northern Affairs Canada (Beavon and Cooke, 2003; Cooke, Beavon, and McHardy, 2004).

2.2 Weighted Index of Social Progress (WISP)

The WISP was developed in 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 between 1970 and 1990. The sub-indices include education, health status, women's status, defence effort, economy, demography, geography, political participation, cultural diversity, and welfare effort.

2.3 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”, an average of the scores on these variables.

2.4 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). They focus on sustainable development, with the central idea is 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 Wellbeing 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.

2.5 Conference Board of Canada's Quality of Life Scorecard

Since 1986, the Conference Board of Canada has annually compared Canada to other Organization 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. 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).

2.6 Genuine Progress Indicator (GPI)

The GPI was developed by San Francisco research and policy organization *Redefining Progress* to measure social, environmental, and economic well-being of the United States by adjusting per capita GDP to account for other variables. 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).

2.7 Fordham Index of Social Health (ISH)

The ISH was developed at the Fordham University's Institute for Innovation in Social Policy (Miringoff and Miringoff, 1999). There are 16 indicators in this index, dealing with health, mortality, inequality, and access to services, used to measure trends in the United States. Different indicators are used to monitor social health in different life cycle stages. Infant mortality, child abuse, the proportion of children in poverty, teen suicides, drug abuse, and high school drop out 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 Zeeman (1997) have produced a modified version for Canada, which uses the rate of social assistance use, rather than food stamp coverage.

2.8 Fraser Institute Index of Living Standards

Economist Christopher Sarlo has developed this exploratory index for the Fraser Institute, in order 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 net worth per capita. These are equally weighted, and calculated from census and other data (Sarlo, 1998).

2.9 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, economic, 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.

2.10 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, besides the CWB, to be specifically applied to Aboriginal populations (Gray and Auld, 2000).

The Index of Relative Indigenous Socioeconomic Disadvantage includes indicators of income, as 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.

3. The Community Well-Being Index

The CWB (McHardy and O’Sullivan, 2004) is a composite index which includes four dimensions of the well-being of Aboriginal communities. It combines elements of the HDI, which was applied at a national and provincial level by Beavon and colleagues (Beavon and Cooke, 2003), and elements of community-level analysis 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 of Canada, and combined to form a single index score, roughly following the methodology of the HDI. Each individual indicator is scaled to reflect the difference between a theoretical minimum and maximum as follows:

Equation 1

$$X_{Index} = \frac{X_{actual} - X_{min}}{X_{max} - X_{min}}$$

The CWB contains two indicators for education, following the methodology of the Human Development Index. The first is a proxy for functional literacy. This is measured by the proportion of the population fifteen and older which has a grade nine or higher education. The second, “high school plus” is the proportion of the population aged 20 and older, with at least a high school education. These two indicators are combined, with 2/3 weight allotted to the literacy proxy, and 1/3 to the high school measure.

The CWB 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 the upper limit at 0.8895, two

standard deviations above the mean observed CSD¹ labour force participation rate in 2001. The second labour force measure is the proportion of the total labour force fifteen and over that was employed in the week prior to the census. The labour force participation and employment measures are given equal weight within the labour force activity component of the CWB.

The CWB also includes income per capita. Typically, income from the census is expressed as average annual income, which is defined as total aggregate income divided by those aged 15 and older who reported income. Because of the relatively younger age structure of the Aboriginal population, and greater proportion reporting no income, the authors felt that income per capita, which divides total income by total population, more closely approximates the amount of monetary wealth within a community. The log function used by the HDI (UNDP, 1999) is applied to the raw income values to account for the diminishing marginal utility of income. As with the HDI, \$40,000 is used as the theoretical maximum. However, whereas the UNDP uses 100 Purchasing Power Parity Dollars as the minimum value for per capita GDP, the CWB uses \$2,000 as a more realistic minimum average annual income in the Canadian context (McHardy and O'Sullivan, 2004: 7).

The CWB also includes two indicators pertaining to housing, a particularly important issue in First Nations 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 were given equal weight in the housing component.

These four components of the CWB; education, labour force activity, income, housing are then combined, with each weighted equally. The final indicator ranges between 0 and 1.0, and is applied to First Nations and other Canadian communities using census data at the Census Subdivision (CSD) level (McHardy and O'Sullivan, 2004: 8).

4. Assessing the CWB as an Indicator of Well Being

There are several factors which should be considered in the development of a composite indicator such as the CWB, as discussed in Sharpe (1999) and Land (2000). In this paper, we concentrate on four conceptual issues surrounding

¹ A Census Subdivision (CSD) is "a municipality or an area that is deemed to be equivalent to a community for statistical reporting purposes". This includes Indian Reserves, and is the geographic classification that most closely represents individual Aboriginal communities (McHardy and O'Sullivan 2004: 3; Statistics Canada, 2003).

composite indicators, including the key dimensions of well-being to be included, the sources of data and their availability and comparability over time, the sensitivity of the indicators to change, and the weights and scaling assigned to the components in the index calculations.

4.1 Dimensions of Well-Being Included in the Index

As described above, and shown in Table 1, composite indicators range from those with relatively few dimensions and indicators, such as the HDI, to the more complex, such as the Weighted Index of Social Progress or Prescott-Allen's indices. The definition of what constitutes "well-being" or "quality of life" deserves more space than is available here, but it is possible to discuss some important considerations for the construction of composite indices. Hagerty and his colleagues write that a quality of life index should include domains that, in aggregate, "address the totality of life experience" (Hagerty et al. 2001; 6). This would suggest a preference for larger indices and a broader, rather than narrower approach to well-being. However, measures with very large numbers of indicators and many dimensions of well-being can easily run into the problem of comparability of data, either over time, or between jurisdictions. The greater the number of measures, the greater the likelihood that the key definitions or methodologies in the collections of some of these data will change over time. Such changes will critically weaken the utility of an index.

Table 1
Key Characteristics of Various 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
Human Development Index (HDI)	3	4		*		*			*	
Weighted Index of Social Progress (WISP)	10	40	*	*				*		*
Quality of Life Index (QOL)	7	7		*	*	*				*
Prescott-Allen's Indexes of the Well-Being of Nations	10	87	*	*	*		*			*
Conference Board of Canada's Quality of Life Scorecard	5	24	*	*		*				*
Genuine Progress Indicator (GPI)	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 ¹	4	12		*		*			-	-
Index of Relative Indigenous Socioeconomic Disadvantage*	4	4	*					*	-	-
Community Well-Being Index (CWB)	4	6	*			*			*	

(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.

A key issue in the construction of such an index is the relationship between the various dimensions of well being. One of the criticisms of the Human Development Index has been that the inclusion of education and knowledge added little over the use of GDP per capita, because of the high correlations among the indicators of the three dimensions (McGillivray, 1991). However, these three dimensions can be argued to address conceptually different aspects of well-being which, although correlated, do not predetermine one another. In fact, it is precisely the lack of a perfect correlation among these dimensions, and the fact that in some countries increases in income are not reflected in health or education, that makes a component index valuable.

The CWB includes four dimensions of well-being in communities; income, education, housing, and labour force activity. Table 2 shows which of the other nine indices also include these dimensions. Income is included in some form in all of the indices, as a measure of people's ability to access goods and services. This is clearly a crucial aspect of well-being in Aboriginal communities as well. Only the GPI and Shookner's (1998) Quality of Life Index for Ontario do not include education as an important component of well-being. The HDI includes education and adult literacy as measures of knowledge, a component of human development that is distinct from income and health. Although they are conceptually distinct, there is considerable evidence of relationships between these dimensions of well-being. In First Nations and other communities, education and knowledge are also valuable not only for their positive effects on income, but because they themselves improve the quality of life of individuals and their communities. As the CWB authors note, in the Canadian context the link between education and health has been found to be particularly strong (McHardy and O'Sullivan, 2004: 5).

Table 2
The Inclusion of Community Well-Being Index Components in Other Quality of Life Indices

Community Well-Being Index (CWB) Components	<i>Human Development Index (HDI)</i>	<i>Weighted Index of Social Progress (WISP)</i>	<i>Quality of Life Index (QOL)</i>	<i>Prescott-Allen's Indexes of the Well-Being of Nations</i>	<i>Conference Board of Canada's Quality of Life Scorecard</i>	<i>Genuine Progress Indicator (GPI)</i>	<i>Fordham Index of Social Health (ISH)</i>	<i>Fraser Institute Index of Living Standards</i>	<i>Ontario Social Development Quality of Life Index</i>	<i>Index of Relative Indigenous Socioeconomic Disadvantage</i>
Income	*	*	*	*	*	*	*	*	*	*
Education	*	*	*	*	*	*	*	*	*	*
Labour Force Activity				*	*	*	*	*	*	*
Housing							*	*	*	*

Some measure of labour force activity and employment is present in seven of the ten indicators. Although in most cases employment will be highly correlated with income, there are reasons to include both in an index of well being. Employment is important not only for the income that it generates, but also as a means and measure of social inclusion and participation in a society. Although there are clearly ways to participate in society other than paid work, unemployment can have negative consequences for individual and community well-being that go well beyond loss of income (Schmid, 1995).

Adequate shelter is a fundamental component of quality of life, human development, or well-being, and has long been identified as a major problem in Aboriginal communities (CMHC, 1996). Housing adequacy is included in some form in four of the ten indices presented above, as well as in the CWB. However, the question is the degree to which including a housing component adds to an understanding of well-being beyond what is captured by income. It may be that in national-level indices, such as the HDI and the WISP, housing quality is mainly captured by per capita GDP. At the sub-national level this might not be the case. Average income in an Aboriginal community may not reflect housing adequacy and availability, particularly if income is distributed inequitably, or if social housing is not among a First Nation's top priorities. Housing quality and quantity, as included in the CWB communities reflects a distinct component of the well-being of Aboriginal communities.

The four components of the CWB do seem to capture separate underlying dimensions of community well-being. It should be noted that the Index of Relative Indigenous Socioeconomic Disadvantage (Gray and Auld, 2000), produced independently of the CWB, includes the same four components of overall community well-being. Nonetheless, there are also some dimensions of well-being not included in the CWB, but which have been identified by the authors of other indices as important. For one, the quality of the natural environment is clearly an important aspect of community well-being, with air and water pollution and other environmental degradation compromising quality of life. Environmental conditions figure prominently in Prescott-Allen's Indices, the GPI, and the Conference Board's quality of life measure, each of which attempt to balance human activity with its environmental costs. Shookner's (1998) Quality of Life Index for Ontario also includes a number of environmental measures, including air quality, the extent of blue box recycling, and one number of environmental spills.

Another dimension which is not included in the CWB is social equity, and particularly gender equity. The UNDP's HDI methodology was criticized for not including measures of women's social and economic position in developing countries. However, rather than re-design the HDI to include these measures, the response

of the UNDP was to include two new measures in the 1995 and subsequent *Human Development Reports*. The WISP includes a Women's Status sub-index, which incorporates maternal mortality rates, female adult literacy rates, female contraception, and female shares of school enrolment (Estes, 1997). Health has long been identified as a fundamental component of quality of life, and has been included in HDI, the WISP, and the GPI, among others. In the HDI, health status is measured by a single indicator, life expectancy at birth. The Conference Board of Canada's Quality of Life Scorecard includes measures of health care resources, utilization, expenditures, the extent of health-care coverage, and social determinants of health, such as the consumption of alcohol and tobacco. Lastly, several of the indicators described above include measures of the threat of crime in a jurisdiction. This is difficult to compare internationally, because countries have widely varying legal regimes, enforcement, and reporting systems. However, the Conference Board of Canada's Quality of Life Scorecard (Conference Board of Canada, 2002) includes rates of property crimes, assaults and threats, and homicides in its comparison of OECD countries, and Diener's Quality of Life Index (1995) includes the homicide rate as a measure of *conservatism* in developing countries.

The environment, equity, health, and freedom from crime are important and distinct dimensions of well-being. However, data considerations may prevent them from being included in an index to measure well-being in Canadian Aboriginal communities. Environmental measures are not available for individual communities, and may in any case be meaningless because environmental damage does not respect community boundaries. Health and crime statistics are difficult to collect at the CSD level, and rates would be very unstable for small communities. Many First Nations communities in Canada have populations of fewer than 200, meaning that small numbers of cases can lead to large fluctuations in mortality, morbidity, and crime statistics. In the case of health, life expectancy at birth, which is the most commonly used indicator of general health in these indices, is impossible to calculate at the community level. Furthermore, morbidity or hospitalization rates may be unreliable, because many hospitalizations require transportation to other jurisdictions.

The authors of the CWB recognize that the index focuses mainly on "mainstream" socio-economic aspects of well-being, and do not take into account the differences in values or cultures between Aboriginal and non-Aboriginal communities, or other aspects, such as physical or psychological health (McHardy and O'Sullivan, 2004: 8). However, the availability of data, particularly those that would allow comparisons between Aboriginal and non-Aboriginal communities means that the CWB is necessarily limited in scope. It should also be remembered that the CWB is part of a large body of Canadian statistics and indicators that can compliment the index.

This is the approach taken in the *Human Development Reports*, in which the UNDP presents not only the three-component HDI, but a variety of other indicators, reflecting the complexity of the concept of well-being. As well, rather than including measures of equity within a single index, a reasonable approach is to calculate separate index scores for men and women, or other subgroups (Sarlo, 1998; Beavon and Cooke, 2003). As the CWB authors emphasize, the CWB will be at its most useful in conjunction with a variety of other indicators.

4.2 Measurement Validity

Ultimately, no single indicator can adequately capture all aspects of well-being or quality of life, but that the utility of these indicators lies in the extent to which the dimensions they do address are validly measured. We will not review all of the various measurement issues here, but will focus on content validity, the relationship between a measurement and the underlying concept it is intended to capture (Maxim, 1999: 208). In the case of the CWB, there are six indicators used to measure the four dimensions of well-being; income, education, housing, and labour force activity. The use of average income from the census to measure income is straightforward enough, and several of the indices described above also include this indicator. However, the education component of the index is more complicated and contains two indicators; the proportion of the population with high school or greater, and the proportion of the population with at least a grade 9 education, a proxy for functional literacy. Although none of the other indicators reviewed here use such a proxy, there is some history of the use of educational attainment to measure literacy. The two research projects that the CWB authors used as a foundation for their index took this approach (Beavon and Cooke, 2003; Cooke, Beavon, and McHardy, 2004; Armstrong, 2001). Furthermore, the United Nations Educational, Scientific and Cultural Organization (UNESCO) benchmarked functional literacy at the U.S. grade 5 level in 1970 (Hagel and Trudge, 1998: 163), and it seems likely that the relationship between adult literacy and adult educational attainment would hold for both Aboriginal and non-Aboriginal communities.

It is important to consider whether an indicator is unambiguously negative or positive in terms of well-being. On the surface, this might seem obvious, and an increase in life expectancy or average income would be a clearly positive development. Some indicators used in composite measures of well-being are not as clearly unidirectional, however. For example, Brink and Zeeman (1997) include the rate of social assistance utilization in their application of the Fordham Index of Social Health to Canada. It is not clear, though, that leaving welfare means moving out of poverty, and recent reductions in welfare expenditures may have had the effect of forcing people off of assistance and into situations in which they were less well off (Frenette and Picot, 2003). Similarly, Shookner (1998) includes the proportion of

children in the care of child welfare agencies, in his proposed community well-being for Ontario. However, increased funding of child welfare agencies may increase the number of children they are able to care for, and increase their reach into the community to identify children who may be in danger.

In this respect, the indicators in the CWB are well chosen. The housing indicators in the index represent a better choice than Shookner's (1998) use of public housing waiting lists, which represent the effects of funding and housing scarcity, but also the rules for eligibility. The educational attainment measures are also unambiguous in their implications for well-being. Changes in employment rates are more difficult to interpret, because they may reflect changes in the number of people who are in the labour force and looking for work. The CWB addresses this by including both employment and labour force participation rates, and giving them equal weight.

4.3 Data Quality and Availability, and Comparability Over Time

Comparability and availability over time are among the major considerations that lead some to prefer indices that have fewer, rather than more, indicators. This has been particularly important in the case of developing countries, where with even the relatively few indicators in the Human Development Report, there are inevitably problems with definitional and data collection have changed from year to year. Table 1 shows the sources of data used in each of the indicators presented here. For many, administrative and national accounts data are used. These include GDP and GNP, but also mortality rates and life expectancy. Some, such as the CWB and the Index of Relative Indigenous Socioeconomic Disadvantage, use census data, while others use other data sources, such as sample surveys.

One of the goals of the CWB is to compare First Nations communities with non-Aboriginal communities, in terms of well-being. A great deal of social-statistical data are collected in Canada at the community or CSD level. However, for most surveys with content covering the domains included in the CWB, such as the Labour Force Survey (Statistics Canada, 2005a), which is the usual source of data on the Canadian labour force, data are not collected in Reserve communities. On the other hand, the two post-censal Aboriginal Peoples Surveys (Statistics Canada, 2005b) were conducted in select reserve communities only, and were administered only to those who identified themselves as Aboriginal people in the 1991 or 2001 censuses.

As a result, the census is the best source of data for a sub-national index such as the CWB². However, it is not without its problems, as the CWB authors note. Census undercoverage of Aboriginal people, either through community or individual non-participation has been long identified, and the degree of the problem varies between years. Nonetheless, the census is the only source of data that permits valid comparison of Aboriginal and Non-Aboriginal communities, and which is available at regular intervals over a long time period.

4.4 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 et al. (2001) refer to 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 in a limited age range. As a result, even programmes that dramatically reduce high school drop-out 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, along with the combined primary, secondary, and tertiary school enrolment ratios, which reflect 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 environmental 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 from the Aboriginal HDI (Beavon and Cooke, 2003) are valid measures of the stock of knowledge and functional literacy in a population, they are not sensitive to annual

² There may be sources of administrative data that are useful for research purposes. However these data may suffer from changes in collection methodology over time, and generally do not include ethnic identity or registration status. Moreover, data on Registered Indians and other Canadians are often collected by different bodies, in different ways and at different intervals. As such, these data sets typically do not allow the reliable comparison of First Nations communities to other Canadian communities.

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 community 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 may represent a reasonable compromise.

4.5 Weighting and Scaling of the Components and Indicators

Another decision to be made in the construction of a composite indicator is how each component of such an index should be weighted. Table 1 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, for theoretical reasons. Others use statistical techniques, such as principal components analysis to empirically determine weights for each indicator (Slottje, 1991). The components in the Index of Indigenous Disadvantage (Gray and Auld, 2000) 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 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 well be the best.

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 generally 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 capital GDP, leave the measure untransformed

(Table 1). 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 United States.

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 individual income in the HDI has meant that Canada generally scores higher than the US on this index. The main thing 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.

5. Conclusions

The Community Well-Being index (CWB) is similar to a number of other composite indicators of well-being, and compares favorably to the other indices reviewed here with respect to its components, the sources of data used, the validity of the measurements, and the weighting and scaling of its indicators. The CWB includes four distinct dimensions of well-being that are particularly important in the context of Canadian First Nations communities; income, labour force activity, education, and housing. Clearly, other aspects of quality of life are important dimensions of life in First Nations communities, including health, the condition of the natural environment, and freedom from crime. However, for reasons of data quality and comparability between communities and over time, these measures are not currently suitable for inclusion in this index.

As discussed above, and as the CWB authors note, no single quantitative indicator can adequately describe the quality of life in a community. The measures that are included in the CWB generally meet the requirement that an indicator will be a valid measurement of the underlying concept, and that it be sensitive to changes over time. The equal weight given to the components of the index is probably the best approach for a small index in the absence of theoretical reasons to weight the components differently, and the log transformation of income is an appropriate way to account for the decreasing effects of income on well-being. Overall, the CWB will be a useful indicator of the well-being of in Aboriginal communities, and as other composite indices have done, it promises to make a positive contribution to Canadian policy research.

References

Armstrong, R. P. 2001. "The geographical patterns of socio-economic well-being of First Nations communities in Canada" Agriculture and Rural Working Paper Series, Working Paper No. 46. Ottawa: Statistics Canada.

Beavon, D. and M. Cooke. 2003. "An Application of the United Nations Human Development Index to Registered Indians in Canada". in White, J.P. Maxim, and D. Beavon, eds. *Aboriginal Conditions*. Vancouver: UBC Press.

Brink, S., and A. Zeesman. 1997. *Measuring Social Well-being: An Index of Social Health for Canada*, Research Paper R-97-9E Ottawa: HRDC.

Canada Mortgage and Housing Corporation. 1996. *The Housing Conditions of Aboriginal People in Canada, 1991*. Ottawa: CMHC.

Cobb, C., G. S. Goodman, and J. C. M. Kliejunas. 2000. *Blazing Sun Overhead and Clouds on the Horizon: The Genuine Progress Report for 1999*. Oakland, Ca: Redefining Progress.

Conference Board of Canada. 2002. *Performance and Potential, 2002-03 - Canada 2010: Challenges and Choices at Home and Abroad*
<http://www.conferenceboard.ca/boardwiseii/temp/BoardWise2JMHCGGMAGLJBIDCGCHFGEKNA2004102293834/P&PReport2002-03.pdf>

Cooke, M., D. Beavon, and M. McHardy. 2004. *Measuring the Well-Being of Aboriginal People: An Application of the United Nations Human Development Index to Registered Indians in Canada, 1981–2001*. Report for the Research and Analysis Directorate, Indian and Northern Affairs Canada. Ottawa: INAC.
http://www.ainc-inac.gc.ca/pr/ra/index_e.html

Diener, E. 1995. "A value based index for measuring national quality of life". *Social Indicators Research* 36: 107-127.

Diener, E. and E. Suh. 1997. "Measuring Quality of Life: Economic, Social, and Subjective Indicators". *Social Indicators Research* 40: 189-216.

Emes, J. and E. Hahn. 2001. "Measuring Development: An Index of Human Progress". Fraser Institute Occasional Paper Number 36. Vancouver: The Fraser Institute.

Estes, R. J. 1997. "Social Development Trends in Europe, 1970-1994: Development Prospects for the New Europe," *Social Indicators Research* 42: 42:1-19.

_____. 1984. *The Social Progress of Nations*. New York: Praeger.

Frenette, M. and G. Picot. 2003. "Life After Welfare: The Economic Well Being of Welfare Leavers in Canada During the 1990s" Statistics Canada Analytical Studies - Research Paper Series No. 192. Ottawa: Statistics Canada.

Gray, M.C. and A.J. Auld. (2000) Towards an Index of Relative Indigenous Socioeconomic Disadvantage. Centre for Aboriginal Economic Policy Research ANU, Canberra. Discussion Paper 196.

http://www.anu.edu.au/caepr/Publications/DP/2000_DP196.pdf

Hagel, A. and J. Tudge. 1998. "Illiterate Adults in Literate Societies: Interaction with a Social World." in de Oliveira, Marta Kohl and Jaan Valsiner, eds. *Literacy in Human Development*. London: Ablex: 163-182.

Hagerty, M. R., R. A. Cummins., A. L. Ferriss, K. Land, A. C. Michalos, M. Peterson, A. Sharpe, J. Sirgy, and J. Vogel. 2001. "Quality of Life Indexes for National Policy" Review and Agenda for National Policy" working paper.

<http://faculty.gsm.ucdavis.edu/~mrhagert/Papers/TOWARDv4.PDF>

Land, K. 2000. "Social Indicators" in Edgar F. Borgatta and Rhonda V. Montgomery (eds). *Encyclopedia of Sociology*, revised ed. New York: Macmillan.

Maxim, P. 1999. *Quantitative Research Methods in the Social Sciences*. New York: Oxford University Press.

McGillivray, M. 1991. "The Human Development Index: Yet Another Redundant Composite Development Indicator?" *World Development* 19 (10): 1461-1468.

McHardy, M. and E. O' Sullivan. 2004. *Nations Community Well-Being in Canada: The Community Well-Being Index (CWB), 2001*. Strategic Research and Analysis Directorate, Indian and Northern Affairs Canada. Ottawa: IANC.

Miringoff, M. and M.-L. Miringoff. 1999. *The Social Health of the Nation: How America is Really Doing*. New York, NY: Oxford University Press.

Prescott-Allen. R. 2001. *The Wellbeing of Nations: A Country-by-Country Index of Quality of Life and the Environment*. London: UNEP/Island Press.

Sarlo, C. 1998. Canadian Living Standards: 1998 Report. *Fraser Institute Critical Issues Bulletin*. Vancouver: The Fraser Institute.

Schmid, G. 1995. Is Full Employment Still Possible? Transitional Labour Markets as a New Strategy f Labour Market Policy. *Economic and Industrial Democracy* 16, 429-456.

Schwartz, S. H. 1994. "Beyond Individualism and Collectivism: New Cultural Dimensions of Values" in U. Kim, H.C. Triandis, C. Kagitcibasi, C. Choi, and G. Yoon (eds.) *Individualism and Collectivism Theory, Method, and Applications*. Thousand Oaks: Sage.

Sharpe, A. 1999. *A Survey of Indicators of Economic and Social Well-Being*. Paper Prepared for Canadian Policy Research Networks.

Shookner, M. 1998. "A Quality of Life Index for Ontario". Paper presented at the Centre for the Study of Living Standards conference on the State of Living Standards and the Quality of Life in Canada. October 30-31, Ottawa.

Slottje, D. J. 1991. "Measuring the Quaility of Life Across Countries". *The Review of Economics and Statistics* 72 (4): 684-693.

Statistics Canada. (2005a) Labour Force Survey:
<http://stcwww.statcan.ca/english/sdds/3701.htm>

Statistics Canada. (2005b) Aboriginal Peoples Survey. from:
<http://stcwww.statcan.ca/english/sdds/3250.htm>

Statistics Canada. 2003. *Geographic Units: Census Subdivision (CSD)*.
www12.statcan.ca/english/census01/Products/Reference/dict/geo012.htm

UNDP. 1999. *Human Development Report 1999*. New York: Oxford University Press.

UNDP. 1995. *Human Development Report 1995*. New York: Oxford University Press.

UNDP. 1990. *Human Development Report 1990*. New York: Oxford University Press.