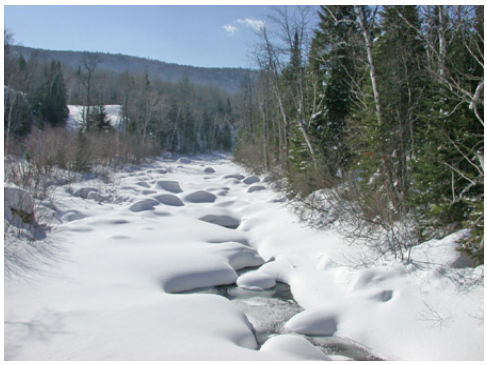

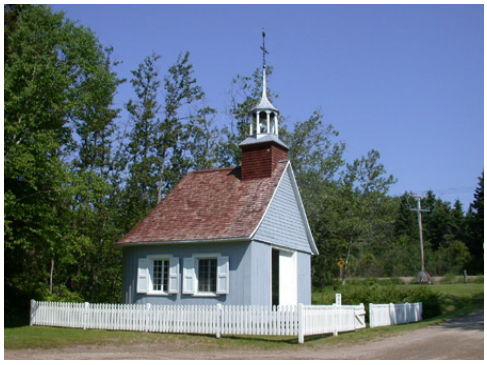

The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

Prepared for the Rural Secretariat of Agriculture and Agri-Food Canada

The New Rural Economy Project, Phase 2 (NRE²)

September 2004

The New Rural Economy Project is an initiative of CRRF

Community Database Indicators Project

The overall objective of this project is to provide indicators for key characteristics of rural areas in Canada. Indicators relating to 1996 and 2001 are identified at the level of the census sub-division (CSD). The following document contains reports for each of the indicators - identifying appropriate theoretical definitions, data information, sources, and evaluations of the measures implemented to create these indicators.

Acknowledgements

The Canadian Rural Revitalization Foundation (CRRF) and The New Rural Economy (NRE) project would like to thank Richard Levesque, Kate Humpage and Claude Denis of the Rural Secretariat of Agri-Food and Agriculture Canada; Ray Bollman of Statistics Canada; Bill Reimer, Moses Geepu Nah Tiepoh and Roger des Ormeaux of Concordia University; and the NRE research team for their valuable contributions to this project.

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The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

1. Economic Stability

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

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New Rural Economy Project, Phase 2 (NRE^2)

September 2004

The New Rural Economy Project is an initiative of CRRF

Introduction

All governments seek economic stability. Stable economies provide a context for easier planning, reduce public discontent, and provide a justification for remaining in power. This remains true for governments at all levels from national to local.

However, attempting to maintain stability will often result in a high rate of inflation (Glyfason, 1999). Thus, as long as inflation continues to rise, the economy must continue to grow for it to maintain stability. Therefore, economic growth often goes hand in hand with economic stability. This is supported not only by political rhetoric but also by the vast amount of literature linking economic growth and economic stability.

Economic fluctuations occur when real GDP does not grow smoothly. Recessions are periods during which real GDP falls reflecting periods of high unemployment and low incomes. These fluctuations in output and employment are often treated as an expected part of the business cycle.

There are two forms of thought associated with economic stability. Some economists view the economy as inherently unstable. They maintain that the "economy experiences frequent shocks to demand and supply…(and) unless policymakers use monetary and fiscal policy to stabilize the economy, these shocks will lead to fluctuations in output, unemployment and inflation" (Mankiw, 2001). These economists believe that policy should stimulate the economy when it is depressed and slow the economy when it is overheated. Other economists take a more laissez-faire point of view since they see the economy as naturally stable and blame poor, inefficient economic policies for fluctuations that occur within it (Mankiw, 2001). They contend that economic policy should not try to fix the economy rather it should simply allow the economy to unfold naturally.

Definition of Economic Stability

As expected, the definitions of economic stability differ between perspectives. Some take an approach that maintains that all economies are stable except for extreme conditions of volatility (Hausmann, 1996). They tend to consider relatively wide fluctuations in the economy as part of its 'natural' stability.

The Department of Finance Canada does not define economic stability but instead focuses on economic growth. They consider it

> "An increase in the production of goods and services over a given period. Nominal growth is the increase including changes in prices while real growth is the increase excluding changes in prices. Statisticians and economists have developed a concept called constant dollars so that they can exclude price changes from measures of growth. Constant dollar gross domestic product (Real GDP) is a measure of growth using the prices of a base year. Changes in constant dollar GDP only capture changes in actual or real production".

Thus, the Ministry of Finance infers that economic stability is a consistent real gross domestic product.

Sundrum considers that economic stability is linked to the basic structure of the economy (1990). Countries that are concentrated in agricultural based economies, for example, are inherently low growth (and low stability) economies, whereas those, which are service oriented, will show high growth (and stability).

Haberler argues that economic growth or stability can be measured by the increase of aggregate GNP, GNP per capita or by the average increase in output per worker. In the short run, there is little difference between aggregate GNP and per capita GNP. Both reflect short-run changes in unemployment. He uses the GNP data to predict the current stage of the business cycle, arguing, “The business cycle can tell us if we are in a recession or boom period and thus looking at this can notify us of our condition. During an upswing, GNP is higher, production is high, unemployment is low…(However) inflation can be an outside factor in the business cycle and slow it down” (1973). In other words, economic variation is considered part of the business cycle, and instability is considered to be extreme fluctuations or variations in that cycle.

Mankiw examines economic stability solely through a macroeconomic perspective. He is simple and to the point when he defines economic stability as the smooth growth of real GDP (Mankiw, 2001).

In conclusion, the consensus among economists is that economic stability occurs when there is consistent growth. However, this growth can be measured in many forms. Many believe that a true measurement of economic growth and stability should rely on real GDP (Mankiw, 2001; Department of Finance; Haberler, 1973). Hausmann (1996) and Sundrum (1990) go a step further and add other indicators to the mix but only at the macroeconomic level. As a result, many economists tend to characterize an economically stable region as one, which has consistent real GDP growth, low unemployment and high personal income levels.

Indicator Development

In accordance with these perspectives we will define economic stability as a measure of minimal fluctuations in output, unemployment and inflation. We will define output as GDP and account for inflation by using Real GDP. We will represent employment trends by using labour force survey estimates to calculate GDP per capita and CSD industry shares in order to measure economic stability at the regional level (Mankiw, 2001).

The following table presents a brief outline of the main indicators included in the index to measure economic stability:

Table 1:
Principle Indicators of the Economic Stability Index

Indicator	Reference	Operational Definition
1. Real Gross Domestic Product (GDP) per capita	Mankiw (2001); Haberler (1973); Sandrum (1990); Dept. of Finance.	((GDP/CPI)/LFS) in each of 11 principle industries for each year, 1987-97 {provincial level}
2. Industry Employment	Sandrum (1990); Dept. of Finance.	Percentage of individuals employed in each of 11 principle industries for 1996 or 2001 {CSD level}
3. Consumer Price Index	Mankiw (2001); Dept. of Finance.	CPI by basket content (all items) for each year, 1987-97 {provincial level}
4. Labour Force Survey (LFS)	Dept. of Finance	Annual averages of employment in each of 11 principle industries for each year, 1987-97 {provincial level}

Indicator Considerations:

1. Real GDP per capita

Gross domestic product (GDP) is an important indicator of economic stability because it monitors the overall growth or output of a given area. For instance, when Real GDP rises, it indicates that there has been growth in the region (Mankiw, 2001). Real GDP per capita is gross domestic product (GDP) divided by the consumer price index (CPI) and then divided by the number of people in the labour force according to the labour force survey (LFS). This measure was used at the provincial level for each of the 11 principal industries[1] in Canada for the years of 1987 to 1997. Real GDP is used to give a better, more accurate reflection of GDP while, at the same time, accounting for inflation.

2. Industry Employment

Employment is a critical factor when calculating the economic stability of a region because output depends on the amount of labour currently in place in each industry sector. Given a constant output/labour ratio and constant technological progress, output will rise as more labour is used. In other words, as rates of employment fluctuate, so will the regional economy. In order to calculate economic stability at the regional level, industry shares of

[1] The 11 principle industries were determined as primary, utilities, construction, manufacturing, trade, transportation, finance & real estate, education, health, accommodation and government. These industries were selected by determining the 11 most predominant industries at the CSD level nationally.

employment at the CSD[2] level were utilized for each of the 11 key industries for 1996 and 2001. Different industry sectors must be incorporated into the economic stability model in order to get a more accurate reflection of stability in a given CSD (Mankiw, 2001).

3. Consumer Price Index

Consumer price index (CPI) is a measure of the overall level of prices that contribute to the cost of a fixed basket of goods, relative to the cost of that same basket the previous year. It is also an indicator of inflation, making the CPI an integral element of economic stability. The CPI data for 1987 to 1997 was factored into the real GDP equation in order to remove the overall influence inflation would have on economic stability. Inflation must be accounted for or the local data will be biased by general trends. By factoring out inflation through Real GDP, we get an unbiased reflection of economic stability attributed to a specific region.

4. Labour Force Survey

Labour force survey (LFS) estimates for each of the 11 key industry sectors at the provincial level for 1987 to 1997 were included in the economic stability index. These annual averages were used in order to get a real GDP per capita for each industry sector at the provincial level. The real GDP for each industry sector was divided by these annual averages of labour force employment for the corresponding industry, which, in turn, gave us the real GDP per capita (Mankiw, 2001).

In summary, here are the steps taken in order to measure the economic stability of a given region:

1. The following formulas were calculated for each of the 11 industries at the provincial level:

   - Real GDP (constant price) was calculated using the following formula:
     - Real GDP {constant} = GDP {current} / CPI * 100
   - Real GDP per capita (constant price) was calculated using the following formula:
     - Real GDP per capita {constant} = Real GDP {constant} / Labour Force Survey Estimate
   - A provincial economic fluctuation index (PFI) was calculated using the following formula:

[2] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.

- PFI = STDEV[3] of Real GDP per capita {constant} from 1987-97 / AVG of Real GDP per capita {constant} from 1987-97

2. A fluctuation index (CFI) was calculated for all CSDs using the following formulas:

   - FI per industry {CSD level} = (Industry Share {CSD level} / Total Industry Share of all 11 industries) * PFI
   - FI total {CSD level} = SUM of all 11 industry FIs calculated above
   - CSD Fluctuation Index (CFI) {CSD level} = square root of the FI total calculated above

Evaluation of the Indicator

Based on the definition of economic stability provided by Mankiw (2001), we have incorporated three key indicators of stability into our index: economic growth, inflation, and unemployment. These have been integrated over the period from 1987 to 1997 since these were the most recent years when data was available at the time when the index was created. Our index measures economic stability from the standpoint of economic fluctuation. Thus, a CSD is deemed to have high economic stability if there degree of economic fluctuation is found to be low. On the other hand, a CSD with low economic stability would have a high degree of economic fluctuation.

The following table presents a breakdown of overall economic fluctuation averages for CSDs in Canada in 1996 and 2001:

Table 2:
Economic Stability: Average Characteristics of CSDs in Canada

	Degree of Economic Fluctuation				
	N	Minimum	Maximum	Mean	Std. Dev.
1996	4041	0	0.443	0.285	0.052
2001	4001	0	0.433	0.283	0.053

In 2001, 4001 CSDs in Canada were analyzed and results of the economic fluctuation index range from a low of .0 [meaning no economic fluctuation was present within a particular CSD] to a high of .433 [meaning there was a very high degree of economic fluctuation present within that particular CSD]. The average degree of economic fluctuation in 2001 for a CSD in Canada was .283. In 1996, 4041 CSDs in Canada were analyzed and results ranged from a low of .0 to a high of .443. The average degree of economic fluctuation for a CSD in Canada was .285 in 1996.

[3] The standard deviation of real GDP divided by the mean of real GDP gives us the coefficient of variation, which is a measure of overall variability (Keller). We will call this measure of variation the Provincial Industry Fluctuation Index (PFI).

The following table presents a breakdown of the average levels of economic fluctuation of CSDs in Canada by province:

Table 3:
Economic Stability: Average of CSDs by Province

Province	Degree of Economic Fluctuation	
	1996	2001
Newfoundland	0.326	0.330
PEI	0.358	0.353
Nova Scotia	0.268	0.265
New Brunswick	0.293	0.290
Quebec	0.260	0.260
Ontario	0.268	0.265
Manitoba	0.332	0.328
Saskatchewan	0.334	0.330
Alberta	0.288	0.288
British Columbia	0.255	0.250
Total	0.286	0.283

Based on the table above, PEI has the highest degree of economic fluctuation for both 1996 and 2001 making it the province with the lowest amount of economic stability. Economic fluctuation levels for the average CSD in PEI dropped slightly from .358 in 1996 to .353 in 2001. Conversely, British Columbia has the lowest degree of economic fluctuation. The level of economic fluctuation for the average CSD in BC decreased slightly from .255 in 1996 to .25 in 2001. Thus, BC was found to be the most economically stable province in Canada.

The following table looks at economic stability averages for CSDs by Urban-Rural Type[4] of CSD:

Table 4:
Economic Stability: Average of CSDs by Urban/Rural Type

Urban/Rural Area Type of CSD	Degree of Economic Fluctuation	
	1996	2001
Urban Core	0.260	0.257
Urban Fringe	0.269	0.263
Rural Fringe, in CMA/CA	0.280	0.272
Urban, outside CMA/CA	0.278	0.276
Rural, outside CMA/CA	0.294	0.290
Total	0.287	0.283

[4] These breakdowns include urban core, urban fringe and rural fringe and distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

As we see in table 4, the highest degrees of economic fluctuations were found in rural areas outside of CMA/CAs for both years. On the other hand, economic fluctuation levels were lowest in urban core areas. In fact, the levels of economic fluctuation steadily increased as the type of CSD moved from urban core to rural outside CMA/CA.

This economic stability index has a few underlying assumptions. First, in order to obtain a fluctuation index at the CSD level, the assumption was made that the fluctuation of an industry located within a particular CSD is proportional to its share of labor force in that CSD. However, this is a reasonable assumption, especially for those CSDs in which the dominant factor of production is labour and any volatility in the level of employment is likely have the greatest impact on economic fluctuation (Meier, 1984).

In addition, the Territories (Northwest, Yukon and Nunavut) were excluded from this index due to the limited amount of available data at the territorial level. Both GDP and CPI data sets were only available at the provincial level and were not available for the three Territories of Canada at the time when the economic stability index was created.

Of all the economic indicators that exist, many are based on a macroeconomic level while only a few can contribute to a regional economic stability index. Therefore, we must omit these indicators from the regional economic stability index. Another problem is that many of the economic indicators (such as technological progress) cannot be directly measured. Thus, we must use proxy variables, which would take time to implement.

Future Research

In the future, research on economic stability indicators may include proxy variables for non-quantitative indicators and integrate these variables into an economic stability index.

If at all possible, it would also be worthwhile to incorporate a measurement for GDP at the regional level rather than provincial. This could be developed into four categories of consumption, investment, government purchases and net exports (Mankiw, 2001). It would be worthwhile developing more indicators that could be used in an economic fluctuation index. These indictors could include resources, various types of industries, openness to globalization, technological progress or adaptation to technology and competition.

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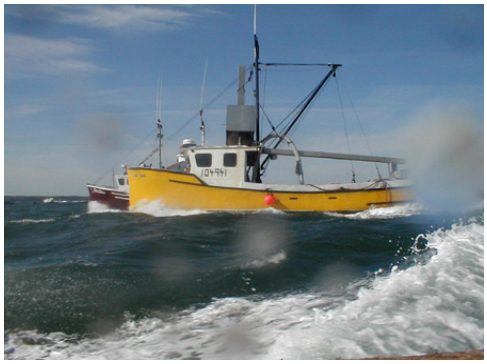
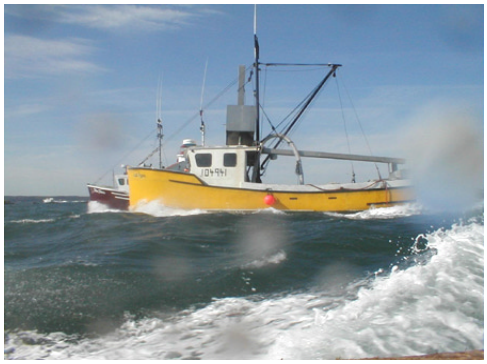


The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

2. Global Exposure & Integration

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

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New Rural Economy Project, Phase 2 (NRE^2)

September 2004

The New Rural Economy Project is an initiative of CRRF

Introduction

Economic integration and exposure has had a significant impact on nations, regions and communities. Exposure to global economic markets has served to alter the way in which people perceive the role of the state and conceptualize society (Hainsworth, 1996). As a region's degree of integration and exposure to global markets changes so does its perception of both the community and the outside world. In fact, global exposure has served to diminish the importance and significance of national borders and strengthened identities beyond those rooted in a particular region or community (Mittelmann, 2002).

Global exposure has also been linked to dramatic declines in labour power as well as a de-emphasis on social programs (Esping-Andersen, 1990). It has also been argued that these changes affect both the need for and the form of employment and social policy (Rhodes, 2002). Exposure to the global economy has been shown to have profound effects on the development of a region. Communities experiencing a high degree of exposure to the global economy have witnessed population declines, increases in labour mobility and increased competition from international markets (Reimer, 2002).

Definition of Global Integration and Exposure

Global economic integration can be defined as the degree to which industries are characterized by international linkages, as measured by the level of intra-industry trade (Makhija, M. V. et al., 1997). Thus, a global economic integration index measures the extent to which an industry's various value-added activities are globally integrated and connected to international markets. While economic integration, in this sense, suggests a two-way trade flow, involving both imports and exports, global economic exposure implies a one-way flow, and may be defined as the extent to which industries are merely export-oriented (Krugman and Obstfeld, 1991).

The Global Economic Integration and Exposure (GEIE) indices were derived in order to measure how much an area, or in this case a Canadian Census Sub-division (CSD)[1], is integrated and exposed economically to the global or international market. Based on a review of economic literature, an important distinction was made between industry global integration and exposure. An industry is considered globally integrated to the extent to which it engages in *both* exports and imports. While on the other hand, an industry is classified as globally exposed to the extent to which it engages in *only* exports.

[1] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.

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Indicator Development

Extensive reviews of economic literature and research on globalization led us to distinguish three types of measures for global economic integration and exposure:

1. Level of Intra-Industry Trade (IIT)

The first type of index, based on the standard Grubel and Lloyd Index of Intra-Industry Trade (IIT), measures the degree of industry global integration as the extent to which firms within an industry perform different value-added activities across national contexts (Grubel, 1975). The IIT index is defined and calculated as the ratio of the absolute value *of net exports* to total trade within an industry: $IIT_{it} = 1 - \frac{|X_{it} - M_{it}|}{X_{it} + M_{it}}$ where X_{it} and M_{it} are, respectively, the levels of industry i's exports and imports in a given period t. This index lies between zero and one, with zero indicating no intra-industry trade (trade consisting *only* of either exports or imports) and one indicating "complete" intra-industry trade (exports equal to imports within the industry).

2. The Level of Industry Exposure: Export Proportion of Total Trade (EPTT)

From the above formulation, a second related index was derived, which measures the degree of industry global *exposure* in terms of the weight of exports in an industry's total trade. The Export Proportion of Total Trade (EPTT) index is defined and calculated as the ratio of exports to total trade rather than the ratio of net exports to total trade: $EPTT_{it} = \frac{X_{it}}{X_{it} + M_{it}}$, where X_{it} and M_{it} are defined as above. Like the IIT index, the value of the EPTT index lies between zero and one, with zero indicating no industry exposure (trade consisting of only of imports), and one indicating "complete" exposure (trade consisting *only* of exports)[2].

3. The Level of Industry Exposure: Export Proportion of GDP (EPGDP)

The third type of index also measures the degree of industry global *exposure*, but defines it in terms of the weight of exports in an industry's total output or gross domestic product (GDP). The Export Proportion of GDP (EPGDP) index is defined and calculated as the ratio of *exports* to GDP: $EPGDP_{it} = \frac{X_{it}}{GDP_{it}}$, where X_{it} is defined above and GDP_{it} is the amount of goods and services produced in the industry. Like the IIT and EPTT indices, the value of the EPGDP index lies between zero and one, with zero indicating no industry exposure (nothing

[2] In cases where there is no trade in the industry, the EPTT and EPGDP indices are mathematically *undefined* (due to a division-by-zero problem). In such events, however, the result can still be rationally interpreted to mean a zero global exposure because if the industry is not exporting and importing anything it can be classified as globally unexposed.

exported from the industry), and one indicating "complete" exposure (all industry output is exported)[2].

The IIT integration measure is likely to be more useful than the EPTT and EPGDP exposure measures for rural communities in which firms rely substantially on imported intermediate inputs and households depend on imported consumer products. On the other hand, the EPTT and EPGDP indexes are likely to be more relevant for communities in which incomes of local industries and of the workers employed by these industries are dependent on exports.

Each of the three types of indices was estimated for three industry classifications: agricultural, manufacturing and communication and other utilities industries. There were four types of datasets used to estimate the indices: trade data, production data, industry labour force data, and income data:

(a) Exports and imports data for the years 1993 to 2002 was collected for each industry category at the provincial level[3];
(b) Gross Domestic Product (GDP) data for 1993-2002 was collected for each industry category at the provincial level[4];
(c) Statistics Canada census data on industry shares of CSD labour for 1996 and 2001 was used;
(d) Statistics Canada census data on CSD-level median household income data for 1996 and 2001 was also utilized.

In order to compute the IIT and EPTT indices, estimates of the amounts of exports and imports for each of the three industries in each CSD for the period 1993-2002 were calculated. An industry's export estimate in a given CSD in year T was obtained by multiplying its proportional share of labor force in the CSD by the amount of its year-T export in the province in which the CSD was located. It is important to point out two key assumptions that underlined this approach. First, since the industry shares or proportions of labour force in a CSD were taken on a single constant year, 1996 or 2001, the obvious assumption was that such industry shares were stable over time in the CSD.

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[3] Export and Import data was obtained via Trade Data Online (http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.htm) and is coded in accordance with the North American Industrial Classification System (NAICS). Only three industrial classifications were available for this analysis: (1) Agriculture, Fishing, Forestry, Hunting; (2) Utilities; and (3) Manufacturing.

[4] Gross Domestic Product (GDP) data was obtained via the Canadian Socio-Economic Information Management System (CANSIM) and measured at basic prices (using 1997 constant dollars) by the North American Industrial Classification System (NAICS) at the provincial and territorial level for the years 1993 to 2002. The three industrial classifications included in this analysis were: (1) Agriculture, Fishing, Forestry, Hunting; (2) Utilities; and (3) Manufacturing.

Second, by taking the product of an industry's share of labour force in a CSD and its province-level export amount as its export estimate at the CSD level, we have made the assumption that such export estimates are directly proportional to the industry shares of labour forces across CSDs within any given province. This means, for instance, that CSDs with higher agricultural proportions of labour force within a province were likely to have higher agricultural exports than those with lower proportions within the same province.

The approach used to derive an industry's import estimate was a bit more indirect than the one used in obtaining the export estimate. Theoretically, imports are considered to be more sensitive to income than to labour participation (Dixit and Norman, 1980; Mankiw, 2001). As a result, industry proportional shares of income in a CSD were utilized rather than labour shares. Due to the lack of available data for these industry shares of income directly, they were extrapolated from the available CSD-level household income data.

Using CSD-level median household income data from the 1996 and 2001 Statistics Canada census, estimates of each industry's share of income in a CSD were calculated by weighting the CSD-level median household income by each of the three industry's proportional shares of labour force. The sum of the resulting three industry labour share-weighted income amounts gives us an estimate of total industry income at the CSD level. This weighting process was required to isolate the part of household income that was attributable to industry labour employment. The level of household income may have other sources beside industry employment especially in places with large number of people with multiple income sources. The ratio of each industry's labour-weighted income to the estimated total industry income was then calculated and used to compute its import estimate at the CSD level. This latter estimate was obtained by multiplying the industry's estimated income ratio in the CSD by the amount of its import in the province in which the CSD was located.

Once again, the method used here was based on the assumptions similar to those made in deriving the industry export estimates. For instance, by considering the product of an industry's income ratio in a CSD and its province-level import amount as its import estimate at the CSD level, we assumed that such an import estimate is directly proportional to the industry shares of income across CSDs within any given province. This means, for instance, that CSDs with higher agricultural income shares within a province were likely to have higher agricultural imports than those with lower income shares within the same province. Having obtained the CSD-level industry export and import estimates, the IIT and EPTT formulas were applied in order to derive these two types of indices. Each type of index was computed for each of the three industries, each of the ten years (1993-2002), and all CSDs in Canada.

In order to compute the EPGDP index, estimates of the amounts of GDP for each of the three industries in each CSD for the years 1993-2002 were calculated. An

industry's GDP estimate in a given CSD at year-T was obtained by multiplying its share of labour force in the CSD by the amount of its year-T GDP in the province in which the CSD was located. This approach was again based on the assumption that the industry proportions of labour force in a CSD were stable over time in the CSD, and that such GDP estimates are directly proportional to industry shares of labour forces across CSDs within provinces.

Evaluation of the Indicator

In order to obtain an overall measure of Global Exposure and Integration for all CSDs in Canada using all three of the indexes discussed in the previous section, the averages of the three indexes was calculated and a new index was created and termed "Overall Global Connectedness". Of course, the assumption is made that each of the three indexes contributes equally to the overall connectedness of a CSD.

The following table breaks down each of the four global integration and exposure indexes for 1996 and 2001:

Table1:
Average Levels of Intra-Industry Trade (IIT), Export Proportion of Total Trade (EPTT), Export Proportion of GDP (EPGDP) and Overall Global Connectedness (CSDCON) of CSDs in Canada (1996 and 2001)

	N	ITT	EPTT	EPGDP	CSDCON
1996	4058	0.22	0.18	0.59	0.33
2001	4028	0.31	0.26	0.71	0.42

Based on the results in the table above, we see that the average overall global connectedness of a CSD has increased from 0.33 in 1996 to 0.42 in 2001. All three indexes which make-up the global connectedness index witnessed increases over the 5-year period with export proportion to GDP experiencing the largest such increase.

The following table provides the breakdown of each of the four global integration and exposure indexes averages for CSDs for 1996 by province and territory:

Table 2:

Average Levels of Intra-Industry Trade (IIT), Export Proportion of Total Trade (EPTT), Export Proportion of GDP (EPGDP) and Overall Global Connectedness (CSDCON) of CSDs by Province and Territory (1996)

Province	ITT	EPTT	EPGDP	CSDCON
Newfoundland	0.28	0.16	0.78	0.41
Prince Edward Island	0.28	0.47	0.52	0.42
Nova Scotia	0.17	0.29	0.68	0.38
New Brunswick	0.33	0.17	0.79	0.43
Quebec	0.24	0.12	0.44	0.27
Ontario	0.18	0.09	0.66	0.31
Manitoba	0.21	0.22	0.55	0.33
Saskatchewan	0.10	0.31	0.66	0.36
Alberta	0.31	0.27	0.66	0.41
British Columbia	0.18	0.09	0.67	0.31
Yukon	0.00	0.00	0.07	0.02
Northwest Territories	0.03	0.08	0.05	0.05
Total	0.22	0.18	0.59	0.33

Based on the table above, we see that overall global connectedness averages were highest in CSDs located in Newfoundland and New Brunswick in 1996. This statistic the result of CSDs located in these two provinces having experienced the highest average rate of exports in proportion to their provincial GDPs (EPGDP) in Canada. In other words, CSDs in the provinces of Newfoundland and New Brunswick tended to export, on average, the majority of the output their province produces within the industries used for this analysis making their level of average overall global connectedness index fairly high. In terms of the intra-industry trade index (IIT), CSDs in Newfoundland and New Brunswick tended to have slightly higher than average levels of intra-industry trade. In terms of the export proportion to total trade index (EPTT), CSDs located within these two provinces actually had average index scores that were fairly close to the national average of 0.18.

Aside from the territories, CSDs in the province of Quebec actually had the lowest degree of global connectedness in 1996. While levels of intra-industry trade (IIT) in Quebec CSDs were close to the national average, the EPTT and EPGDP indexes were below the national average. CSDs in Ontario and British Columbia followed next with lowest average overall global connectedness scores in Canada.

The following table presents a breakdown of these four global exposure and integration indexes by province and territory for 2001:

Table 3:

Average Levels of Intra-Industry Trade (IIT), Export Proportion of Total Trade (EPTT), Export Proportion of GDP (EPGDP) and Overall Global Connectedness (CSDCON) of CSDs by Province and Territory (2001)

Province	ITT	EPTT	EPGDP	CSDCON
Newfoundland	0.34	0.40	1.03	0.59
Prince Edward Island	0.10	0.59	0.60	0.43
Nova Scotia	0.20	0.34	0.80	0.44
New Brunswick	0.40	0.33	1.03	0.59
Quebec	0.38	0.21	0.50	0.36
Ontario	0.26	0.13	0.77	0.38
Manitoba	0.33	0.33	0.84	0.50
Saskatchewan	0.14	0.32	0.78	0.41
Alberta	0.40	0.32	0.68	0.47
British Columbia	0.32	0.16	0.79	0.42
Yukon	0.01	0.00	0.16	0.06
Northwest Territories	0.15	0.24	0.13	0.18
Total	0.31	0.26	0.71	0.42

From the results in Table 3, we see that there has been little change in global exposure and integration since 1996. CSDs in Newfoundland and New Brunswick once again experienced the highest levels of global connectedness and CSDs in Quebec once again experienced the lowest among the ten Canadian provinces. Table 5 presents a breakdown of the four global exposure and integration index averages for CSDs by Urban-Rural status[5]:

Table 5:

Average Levels of Intra-Industry Trade (IIT), Export Proportion of Total Trade (EPTT), Export Proportion of GDP (EPGDP) and Overall Global Connectedness (CSDCON) of CSDs by Urban-Rural status (1996 and 2001)

	1996				2001			
Urban area/Rural area	ITT	EPTT	EPGDP	CSDCON	ITT	EPTT	EPGDP	CSDCON
Urban Core	0.20	0.12	0.60	0.31	0.35	0.22	0.73	0.44
Urban Fringe	0.24	0.16	0.67	0.36	0.35	0.23	0.81	0.46
Rural Fringe, in CMA/CA	0.22	0.17	0.61	0.33	0.31	0.25	0.73	0.43
Urban, outside CMA/CA	0.24	0.18	0.67	0.36	0.36	0.27	0.78	0.47
Rural, outside CMA/CA	0.21	0.19	0.56	0.32	0.29	0.27	0.68	0.41
Total	0.22	0.18	0.58	0.33	0.31	0.26	0.71	0.42

[5] These breakdowns include urban core, urban fringe and rural fringe and distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

Based on the results in Table 5, we see that levels of global connectedness are fairly similar across all types of urban and rural CSDs. Levels of global connectedness were found to be highest in CSDs located within urban areas outside of census metropolitan areas (CMA) and census agglomerations (CA). CSDs in rural areas outside of CMA/CAs experienced the highest average of exports to total trade (EPTT) while CSDs in urban core areas experienced the lowest average of EPTT for both 1996 and 2001.

Future Research

In future, the development of an economic exposure and integration indices might want to include more industries. Currently, we are limited to focusing on agricultural, forestry, fishing, hunting, utilities and manufacturing industries due to the lack of available GDP and import/export data at the industry and provincial level. It might also be pertinent to explore the subject of GDP at the regional level. We are currently limited to exploring GDP only at the provincial level due to data limitations.

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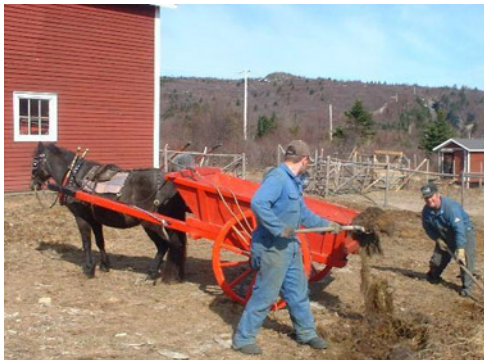

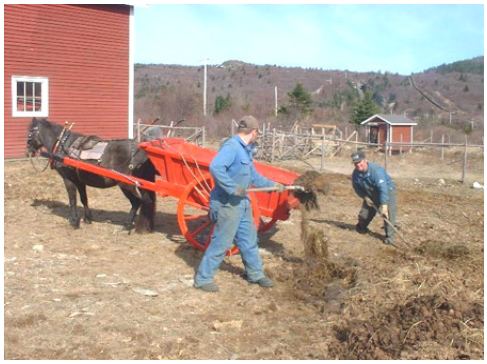

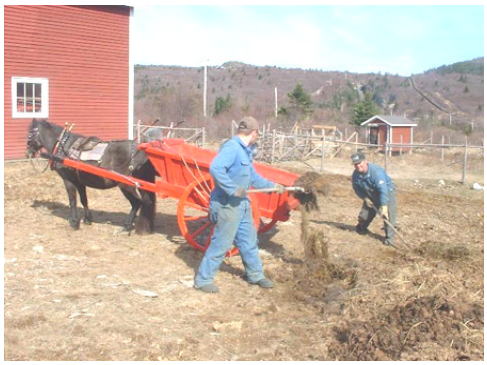

The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

3. Social Progress

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

Report Authors:
Corinne Harris
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New Rural Economy Project, Phase 2 (NRE^2)

September 2004

The New Rural Economy Project is an initiative of CRRF

Introduction

The concept of social progress has long been considered important. Nearly 2000 years ago, Aristotle considered that the definition of a 'good society' should be the central task of philosophy (Salvaris, 2000). With the commencement of the industrial revolution, social progress began to be measured strictly from an economic perspective. In measuring the progress of a society solely by its Gross Domestic Product (GDP) and the average income of a city, region, or country, one is relying on the assumption that the more economic gain experienced, the greater the progress. Only during the past four decades has social progress been measured by including factors beyond the economic indicators of the GDP and average income (The Futurist, 1990; Salvaris, 2000; Osberg, 2001).

The measurement of social progress beyond the GDP is important for sound economic policy to be formulated, since "the quality of economic development is at least as important as the quantity of economic activity as measured by GDP" (Venetoulis & Cobb, 2004). If governments are reporting progress based solely on the GDP, they are not giving a clear picture of progress. The World Bank and United Nations Development program (UNDP) both emphasize that "the goals of development are to improve the lives of human beings, and so the success of development programs must be assessed in human rather than strictly economic terms…the purpose of development is to offer people more options" (The Futurist, 1990). The GDP cannot distinguish between growth (an increase in quantity) and development (an improvement in quality) (Osberg, 2001), and "measuring the market value of economic production tells us very little about the broader health of the community, of the environment, and nothing about the social costs of what has been produced in the economy, or about its usefulness or sustainability" (Salvaris, 2000).

Definitions of Social Progress

Social progress has been measured and compared *between* countries, as well as measured and compared *within* a country, region or community over time. A variety of indexes have been created to measure social progress nationally, regionally and locally (Salvaris, 2000). Often the creation of these indexes has been triggered by a sense of actual or likely decline in economic and social well-being with broad social and economic problems needing community-wide solutions (Salvaris, 2000). Today, the three realms of social progress considered significant are those containing indicators that can be measured from a social, economic and environmental standpoint. The measurement of social progress has also become value based and must answer the question "progress towards what?" (GPI Atlantic Website; Custance and Hillier, 1998). "Achieving sustainable development is…a continual process of balancing progress towards objectives in each of the three areas (social, economic, environmental). It means not achieving improvements in one dimension at the expense of the others" (Custance and Hillier, 1998).

The economic realm of social progress has been analyzed for decades through the utilization of the GDP and average income (Futurist, 1990; Cobb et al, 2000). Despite the fact that these factors should not be the sole measurement of social progress, they are not to be ignored in its measurement either. Difficulty arises when attempting to include environmental and social aspects in the analysis of social progress since they have only been considered more recently and those indicators tend to be more abstract and specific to a community or region. Within the environmental realm of social progress, the critical concept appears to be sustainable development where social progress can be understood as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Custance and Hillier, 1998).

When considering the measurement of progress from a social perspective, it is quite evident both economic and social issues are closely linked. The fact that both social and economic factors are so closely linked "arises partly because economic development and prosperity are important determinants of 'sociological' change and partly because the resources produced by economic growth enable social policy expenditures" (Osberg, 2001). Conversely, "the process of economic production has social implications and social change strongly influences economic events". Thus, a definition of social progress "must reflect a broader conception of events than the purely economic" (Osberg, 2001).

The Genuine Progress Indicator (GPI) uses similar personal consumption data as the GDP but also makes some crucial distinctions. The GPI "makes adjustments for certain factors (such as income distribution), adds certain others (such as the value of household work and volunteer work), and subtracts others (such as the costs of crime and pollution). Because the GDP and the GPI are both measured in monetary terms, they can be compared on the same scale" (Redefining Progress Website). Sharpe (1999) also argues that the GPI is multi-faceted in its measurement of social progress because it "measures consumption from the national accounts and then proceeds to make a large number of adjustments". Consideration of the three realms of social progress is included within the GPI, with the social and especially environmental realms being expanded in the 22 variables included in the Nova Scotia GPI (GPI Atlantic Website).

Along with considering social progress from social, economic and environmental dimensions, Osberg (2001), breaks down the measurement of social progress even further. He looks at social progress from the perspective of 'needs' (or basic human rights) and 'wants' and points out how social philosophers "have attempted …to establish the capabilities, freedoms and rights which are essential preconditions for the autonomy of all citizens". Depending on one's perspective, a person or group may value something more than another person or group and so it is with this in mind that Osberg argues that social progress "must be measured in the 'enabling' sense that a society progresses when it enables more of its citizens to choose the kind of life they personally have reason to value". He

also maintains that “social progress consists of first meeting ‘needs’ and then satisfying ‘wants’” (Osberg, 2001).

Both the World Bank’s World Development Indicator and the United Nation’s Human Development Index (HDI) include 3 variables that together demonstrate whether or not a nation’s economic growth is translated into improved human well-being and social progress. The HDI is calculated as the average of the following three components: life expectancy at birth; adult literacy and; purchasing power (UNDP) or consumption per capita (World Bank) (The Futurist, 1990). Once again the key components of social progress encompass the economic, social, and environmental realms. Sharpe (1999) labels the HDI as a cross-national index of well-being. Therefore, this index is not ideal for measuring the social progress of regions within Canada since it is an index which is better suited to comparisons between nations.

The Quality of Life index (QOL) developed by psychologist Ed Diener at the University of Illinois is based on a universal set of values. The three realms of social progress appear also to be present in this index given that these values are considered to “reflect three universal requirements of human existence: meeting biological needs, coordinating social interaction, and the survival and welfare of the groups” (Diener, 1995). These three universal requirements to which Diener is referring were proposed by Schwartz (1992), and while the first and last requirement may be understood readily, the *coordinating of social interaction* as a universal value may not be. According to Schwartz, this universal value implies that “individuals restrain impulses and inhibit actions that might hurt others” (Schwartz, 1992). In other words, he is describing value types that “support smooth social relations” (Schwartz, 1992) such as security, pro-social and restrictive conformity.

The ‘Index of Economic Well-being’ (IEWB) developed by Lars Osberg and Andrew Sharpe utilizes 22 variables to measure social progress. Sharpe compares and contrasts the IEWB to the GPI, the Measure of Economic Welfare (MEW), the Index of Social Health (ISH), and the Index of Living Standards (ILS). Although these indexes concentrate mainly on the economic aspect of social progress, the IEWB includes a wide range of indicators (16) including both social and environmental variables. Osberg and Sharpe’s paper led to a website by the Organization for Economic Co-operation and Development (OECD) where 56 social indicators were included ranging from the rather general to self-sufficiency, equity, health and social cohesion indicators. Although not specifically termed social progress indicators, many of them were similar if not the same as those contained in social progress indexes. The indicators included in the OECD website were very comparable to those found in the QOL.

Based on the aforementioned literature, we propose a conceptual definition that recognizes that any index of social progress should be value-based and answer the question “progress towards what?” An index of social progress must go

beyond a purely economic measure and should focus on needs of future generations by taking a long-term view, rather then simply generating economic growth (Custance and Hillier, 1998). Economic, social and environmental variables must be considered in determining social progress as well as basic human rights within the three realms. The concept of social progress is multifaceted. Within the term 'social progress' it is evident that the consideration of human needs must go beyond purely economic and must include numerous social and environmental aspects.

Social Progress Indicator Development

As indicated, the three main realms in which to measure the social progress of a region are economic, social and environmental. The Nova Scotia GPI and the QOL appear to be two indexes that give the most detailed, clear overall measurements of social progress that can be adapted to a variety of needs both at the community and regional level. The following tables include indicators that measure social progress divided into the three subgroups of social, economic and environmental. Below each table, you will see rationale behind why each variable was chosen or not chosen.

Table 1:

Social Realm

Indicator	Index	Operational Definition
1. Level of Education	N.S. GPI OECD QOL WISP	Percentage of individuals with a grade 9+ level of education at census subdivision (CSD) level
2. Level of Crime	N.S. GPI OECD QOL	Not Available (N/A)
3. Life Expectancy	HDI OECD	Life expectancy at birth in average number of years at the health region (HR) level
4. Quality of Housing: affordability of housing compared to income	QOL OECD	N/A
5. Population growth	OECD QOL	Percent population change at the CSD level over the previous 5 years
6. Young Dependency Ratio	QOL OECD	Young dependency ratio at the CSD level

Considerations for the measurement of social progress index in the social realm:

1. The level of education in a population is a key indicator of social progress. Education contributes to an individual or group's ability to generate income, organize, cope with challenges, and manage personal and collective objectives. Our indicator uses the percentage of individuals who have a grade 9 education or higher in a census subdivision (CSD)[1] was selected as a good indicator over post-secondary education. Post-secondary education opportunities are not always available in every region of Canada and often, individuals who want to pursue a higher level of education are forced to leave their area in order to do so.

2. Measuring the various crime rates is a good indicator of whether social progress is occurring in a region. Lower levels of crime reflect a general concern for others among the population, greater social equality, and lower levels of social unrest. However, it is difficult to determine what types of crime (property, criminal, etc.) affect social progress the most. There also an issue with the discrepancies between reported crime versus actual crime. This information may be available through the Canadian Centre for Justice Statistics. However, data on actual crime is very hard to come by especially at the regional and local level. There is the problem that crime data is collected at administrative levels that don't always match well with CSDs. It is not clear whether the crime statistics represent the residence of the perpetrator, the location of the crime, or the place where the police detachment is. For these reasons, crime was not selected as an indicator of social progress for our index.

3. Life expectancy can be very useful indicator to demonstrate the overall health of a region. In the development of our indicator to measure social progress, we have chosen life expectancy at birth in average number of years at the health region level[2]. The life expectancy value for a health region is assigned to each CSD in its jurisdiction.

4. The amount of income a tenant must devote to shelter is also an important determinant of social progress. The greater the percentage, the fewer resources are available for other needs and desires: food, clothing, recreation, and new initiatives. The QOL measures the percentage of renters paying 30% or more of income for rent. This variable takes into account the percentage of a tenant's average total monthly income spent on shelter-related expenses (i.e.: rent, electricity, municipal services, etc.). This variable was not chosen as part of our social progress index because

[1] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less than 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.
[2] Health regions are defined by the provincial ministries of health and contain several CSDs depending on the size and population of each region.

it was not included in the 1996 Statistics Canada data that we are working with. Income will be accounted for in social progress index later on as part of the economic realm in table 2.

5. In Canada, most regions are not replacing populations via births, so population growth in an area may only be occurring via in-migration. Population growth is often at the basis of many other quality of life issues such as services, employment, income as well as other socio-economic factors. The population change variable measures the percentage of population change between 1996 and 2001. This variable was available only for the 2001 census thus, it was only included in the construction of the social progress index for 2001.

6. The proportion of young dependents has also been found to negatively impact social progress since it requires a higher proportion of economic and social resources to be devoted to the care of the young. In our measurement of social progress, the young dependency ratio at the CSD level has been selected. The young dependency ratio represents the number of dependents, under the age of 20, for every 100 people in the working age population (20-64 years old).

Table 2:

Economic Realm

Indicator	Index	Operational Definition
7. Income Distribution Incidence of Low Incomes Debt, External Borrowing and Capital Movements (GDP) Valuations of Durability Composite Livelihood Security Index	N.S. GPI R.P. GPI OECD HDI QOL	Percentage of households which fall below the low Income cut-off (LICO) at the CSD level
8. Unemployment/ employment rate	OECD QOL	Unemployment rate of individuals 15 years and older at the CSD level

<u>Considerations for the measurement of social progress index in the economic realm:</u>

7. The distribution of the overall income is an important indicator of social progress. Populations where incomes are polarized into rich and poor tend to face higher levels of social conflict and a lower quality of life for all. For the purposes of this index, LICO (low income cut-off) at the CSD level was selected. LICO identifies the income levels at which families or unattached individuals spend 20% more than average on food, shelter and clothing. It is adjusted for family and community size.

8. Higher unemployment rates tend to lower economic stability within a region and contribute to numerous negative social outcomes including depreciation

in mental and physical health. In the case of our index, the rate of unemployment at the CSD level has been chosen to measure social progress.

Table 3:
Environmental Realm

Indicator	Index	Operational Definition
9. Greenhouse gas emissions Sustainable Transportation Ecological Footprint Analysis Air Quality Water Quality Waste management (recycling, compost, etc.)	N.S. GPI QOL	N/A

Considerations for the measurement of social progress index in the environmental realm:

9. The quality of the environment has proved to be a fairly relevant indicator of social progress. High levels of pollution and over-use of natural resources typically lead to health, economic, and social problems. Measurements such as air and water quality in an area are often determinants of the overall health of the environment, its sustainability and the overall health of its population. Unfortunately, data on this subject at the regional level is very limited and hard to come by. As a result, it will not be included in our measurement of social progress but should be considered in the future.

To summarize, the formula used for our operational definition of the social progress index appears as follows:

Table 4:
Social Progress Index Formulation

SOCIAL PROGRESS INDEX=
+ % With Grade 9 education or higher
+ Average life expectancy in number of years
+/- % Population change from 1996 to 2001
– Young dependency ratio
- % Below LICO
- Unemployment rate

Evaluation of the Indicator

This formula to measure social progress uses standardized scores, or *Z* scores[3], in order to calculate this index. Each of the 6 indicators we have chosen have equal weight. In other words, education has no more or less importance or weight than does population change or young dependency ratio. Based on the literature, none of these 6 indicators seemed to demand a greater value than any others.

The following table presents the overall social progress index averages for CSDs in Canada:

Table 5:
Social Progress: Average Characteristics of CSDs in Canada

Social Progress	N	Minimum	Maximum	Mean	Std. Dev.
1996	3921	-13.593	5.590	0.030	1.934
2001	3955	-12.622	18.543	0.025	2.219

From these results, we see that the level of social progress in Canada is very low and relatively stable. The average CSD in Canada had a social progress score of .025 in 2001, which is actually down slightly from .03 in 1996. At the same time, the variation between CSDs has increased with the standard deviation rising from 1.934 in 1996 to 2.219 in 2001. The following table presents the average social progress index breakdown of CSDs in Canada by province and territory:

Table 6:
Social Progress: Average of CSDs by Province

Province	1996	2001
Newfoundland	-2.656	-2.943
Prince Edward Island	0.259	0.053
Nova Scotia	-0.768	-1.217
New Brunswick	-0.166	-0.317
Quebec	0.319	0.645
Ontario	0.266	0.211
Manitoba	0.501	0.069
Saskatchewan	0.896	0.650
Alberta	-0.225	0.156
British Columbia	0.209	0.002
Yukon	0.061	-1.671
Northwest	-0.295	-0.950
Nunavut	-7.204	-7.627
Total	0.030	0.025

[3] *Z* scores are a special application of the transformation rules. The *Z* score indicates how far and in what direction an item deviates from its distribution's mean, expressed in units of its distribution's standard deviation (Hoffman, 2002).

Based on the results found in the table above, CSDs in the province of Saskatchewan had the highest average rate of social progress. CSDs in Saskatchewan had a social progress index of slightly less than .9% in 1996 and .65% in 2001. On the other hand, CSDs in Nunavut were found to have the lowest rate of social progress. CSDs in Nunavut territory had a social progress average of –7.6% in 2001 on average. However, we are only dealing with 23 CSDs in the case of Nunavut. Among the ten Canadian provinces, CSDs in Newfoundland were found to have the lowest rate of social progress with CSDs in that province having an average of –2.9%.

The final table looks at social progress averages by Urban-Rural type[4] of CSD:

Table 7:
Social Progress: Average of CSDs by Urban/Rural Type

urban area/rural area type	1996	2001
urban core	0.268	0.346
urban fringe	0.370	0.729
rural fringe, in CMA/CA	0.365	0.563
urban, outside CMA/CA	0.010	-0.226
rural, outside CMA/CA	-0.127	-0.062
Total	-0.020	0.032

As we see in table 7, the level of social progress tends to be lowest in rural areas outside of CMA/CAs and highest in urban fringe CSDs. Average rates of social progress in urban fringe CSDs also showed the greatest increase over the 5-year period with the average having risen from .37 in 1996 to .73 in 2001. Thus, being located near but not in an urban core region seemed to be most favorable for the conditions of social progress.

Future Research

In future studies, it would interesting to look at the impact of the environment and crime on social progress. For the purposes of this index, we were limited to focusing mainly on census related data to explore the issue of social progress. Expanding our definition to include such things as the property crime, violent crime, water and air qualities would be extremely worthwhile in all future research conducted on the issue of social progress.

[4] These breakdowns include urban core, urban fringe and rural fringe and distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

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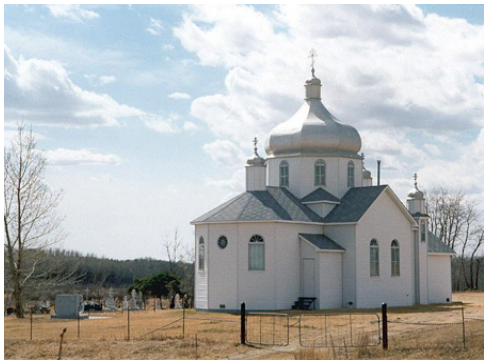

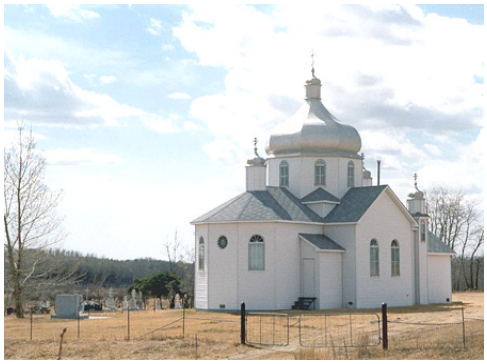

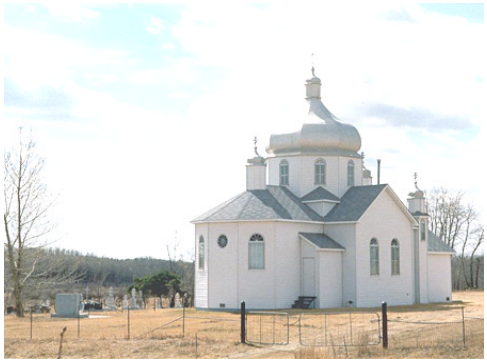

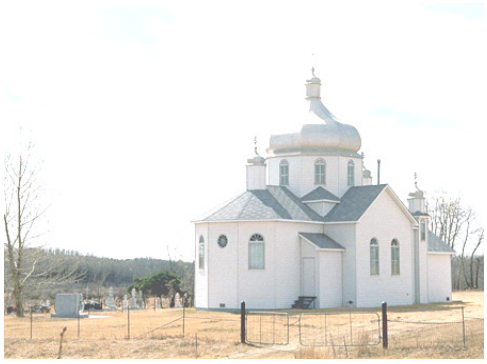

The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

4. Local Institutional Capacity

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

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New Rural Economy Project, Phase 2 (NRE^2)

September 2004

Introduction

Institutional capacity is generally understood as a measure of the capability of an institution, or group of institutions, to perform key functions effectively and efficiently, and to operate in a self-reliant manner (Hopkins, 1996). More specifically, institutional capacity is the ability and competence of an institution to carry out mandated operations and produce outcomes by deploying the necessary resources within an appropriate structural context (Bhagavan & Virgin, 2004; VanSant, 2000). The inter-connectedness, sustainability and autonomy of institutions are also key features of institutional capacity (Bhagavan & Virgin, 2004; Hopkins, 1996; Lusthaus et al., 1995; McGuire, 1994; Morgan & Taschereau 1996).

Local institutional capacity (LIC) refers to the abilities, activities and potential of multiple institutions working in concert within a given area. Indicators of LIC allow for diagnostic and comparative analyses and facilitate the development of strategic responses to trends affecting all regions of Canada making them a necessary tool for policy and research objectives. The degree of institutional capacity in a given area can have a dramatic effect on the number of opportunities a region can identify and create. The development of high quality indicators can contribute to an increased ability to identify opportunities, existing and potential strengths, weaknesses and trends, as well as provide insight into the ways LIC might be mobilized to respond to specific needs.

Definition of Local Institutional Capacity

Most of the literature dealing with the measurement of institutional capacity approaches the issue from the perspective of individual institutional assessment, rather than local or regional diagnostic strategies, and from the perspective of developing nations rather than a regional Canadian perspective. As a result, much of the discussion of institutional capacity deals with indicators of institutional development in contexts where institutions are few in number and/or relatively newly established. As well, a significant share of the literature deals with indicators of institutional capacity to promote environmental sustainability, though this material has not been included in any depth here because it follows from a conception of institutional capacity that is not easily replicated in other spheres of institutional activity.

Within the material focusing on developing nations and individual institutions there is a significant body of literature that treats institutional capacity from a broad enough perspective to provide insight into the types of institutions and key capacity areas to be included in an assessment of LIC. While the general capacity areas are discussed below, none of the specific indicators derived from the literature have been included in this report because they are intended for individual institution-level assessment with a predominantly participatory and qualitative orientation. The indicators proposed below are informed by the literature but not taken directly from it.

Within discussions of institutional capacity, institutions can be understood as entities with an organizational structure, with human, technical and financial resources, and with "normative relationships, rules and action patterns" (Hopkins, 1996: 4; see also Bhagavan & Virgin, 2004). It has been argued that assessments of institutional capacity should include knowledge-generating institutions, government entities, NGOs, and community-based organizations (Bhagavan & Virgin, 2004). The World Bank has also developed an approach to sector-wide institutional capacity assessment, which includes three levels of analysis: the political-structural level, the administrative-systems level, and the technical-sectoral level (Morgan & Taschereau, 1996). Together, these provide an idea of the parameters or scope of a complete analysis of LIC.

Based on their review of the literature on institutional capacity, M.R. Bhagavan & I. Virgin (2004) have identified the following key capacity areas that tend to be identified for comprehensive institutional assessment: 1) Information & knowledge, 2) Competence & ability, 3) Governance, institutional economy, institutional finance, 4) Technical & infrastructural resources, 5) Policy arena, and 6) Policy instruments. Indeed, each of the authors reviewed here has designed a matrix of capacity areas consisting of various approaches to defining and classifying these key elements.

Bhagavan & Virgin focus on institutional capacity as indicated by competence (human resources, knowledge & skills), resources (technical & financial) and structures (relations, rules, values, behaviour). They argue that institutional assessment should consider the availability and accessibility of information, the ability of institutions to mobilize financing, and the availability of knowledge and skills, recruitment procedures and training.

The Canadian Public Health Association has developed a framework which, while relevant primarily to the health care sector in Canada, mirrors many other authors' and organizations' emphasis on the importance of management, knowledge and skills, leadership, and institutional networking, information sharing and research for institutional capacity building initiatives. In addition to these elements, Lusthaus et al. (1995) point to the need for strategic planning and niche management as key ways to enhance organizational capacity. Similarly, the IMF (2002) has presented a conceptual approach to capacity assessment that prioritizes information management (capacity to gather, analyze and apply information), resource management (capacity to access and mobilize resources and to forecast and produce outcomes through service provision and project implementation) and governance (transparency and legitimacy, capacity to make and enforce regulations, policies and reforms).

Morgan & Taschereau (1996) provide an overview of the World Bank's approach to "macro-level" institutional assessment. This approach deals with assessment through three broad areas: forces in the external environment, institutional factors, and inter-institutional linkages. The forces in the external environment

include “administrative and legal, political and economic, social and cultural” factors, including stakeholder analysis; institutional factors include “history and mission, culture, leadership, structures, human and financial resources, formal and informal management systems, and an assessment of performance” (Morgan & Taschereau, 1996: 12[1]).

Jerry VanSant (2000) has regrouped the major components of institutional capacity into the following categories: 1) institutional resources - legal structure and governance, human resources, management systems and practices, financial resources; 2) institutional performance - program results, networking and external relations, application of technical knowledge, constituency empowerment; and 3) institutional sustainability - organizational autonomy, leadership, organizational learning.

VanSant’s paper also includes a review of existing assessment and measurement models, two of which are particularly relevant to the analysis of LIC: the Organizational Assessment Capacity Tool (OCAT) and the Institutional Strength Assessment (ISA) model. The major capacity areas identified in OCAT are governance, management practices, human resources, financial resources, service delivery, external relations, and sustainability. A report by USAID also outlines the key areas addressed in the OCAT, as well as identifying the strength of the tool for deriving numeric capacity scores from qualitative assessments and empirical observations (USAID, 2000). The ISA model uses many of the same capacity areas as the OCAT, but adds organizational learning and the use and management of technical knowledge as two critical dimensions to consider in any institutional assessment (VanSant, 2000).

Conceptual Definition

From the various approaches outlined above, it is possible to develop an integrated conceptual definition to be employed for the development of indicators. *Local institutional capacity is understood as a community-level measure, where institutional capacity is the competence of institutions to access and manage resources, to carry out key functions, and to initiate structural reform when necessary in order to maximize the first two capacities and ensure institutional sustainability.* This conceptual definition is representative of the major capacity areas common throughout discussions of institutional capacity. One of the many strengths of this approach from a conceptual perspective is that it includes institutional adaptability as a feature of capacity, which has been loosely associated with the concept of autonomy but not emphasized in its own right.

Indicator Development

Following from the conceptual definition, which is modeled after the structure of OCAT and the major areas identified throughout the literature, the following

[1] Page number corresponds to PDF document.

operational definition can be adopted: local institutional capacity is the aggregated capacities of individual institutions in a given census sub-division (CSD)[2] or census consolidated sub-division (CCS)[3], where institutional capacity is characterized by the competence (demonstrated practical ability) and autonomy (legal and structural ability) of institutions in the following activity areas: 1) accessing and managing resources (financial, human, and technical, including accessing and managing information); 2) carrying out key functions (providing information, services and training; contributing to social and economic progress); and 3) initiating structural reform when necessary in order to maximize the first two capacities and to ensure institutional sustainability (through internal governance and inter-institutional relations).

Based on this operational definition, below are some of the key elements that should be accounted for in an LIC index:

<u>The capacity to access and manage resources</u>

1. Management practices: management of human, financial and technical resources, organizational learning, strategic planning

Indicator	Rationale	Operational Definition
Employee Evaluations	Employee evaluations promote the quality of human resource management which, in turn, promotes proper use of financial resources leading to higher institutional capacity	Not Available (N/A)
Budgetary performance	Strong economic performance indicates high institutional capacity	N/A

2. Human resources: availability of skilled and knowledgeable labour force, effective recruitment and training procedures

Indicator	Rationale	Operational Definition
Multilingualism	In Canada, multilingualism of workers indicates institutional capacity to respond to multi-cultural public and to access & share intra/international resources & knowledge (Mitra, 2001; Commissioner of Official Languages, 2004)	Percentage of bilingual individuals (i.e.: knowledge of both English & French) at the

[2] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less than 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.
[3] A census consolidated subdivision (CCS) is a group of adjacent CSDs aggregated with a proximate larger CSD (Statistics Canada, 2004).

Indicator	Rationale	Operational Definition
		CSD level
Education	Level of education is an indicator of skills and knowledge. Specialized and professional education and training are recognized as indicators of institutional capacity (Bhagavan & Virgin, 2004; Hopkins, 1996; IMF, 2002)	Percentage of individuals with a post-secondary education at the CSD level
Highly skilled workers	Indicates extent of highly skilled human resources available to institutions which, in turn, contributes to local institutional capacity	Percentage of workers employed in intellectual and managerial occupations at the CCS level
Self-Employment	Individuals who are self-employed are not working in institutions, thus negatively affecting local capacity	Percentage of workers who are self-employed at the CSD level

3. Financial resources: ability to secure and mobilize funding, adequacy of financial resources available

Indicator	Rationale	Operational Definition
Provincial spending on education, health and social services	Indicates relative level of financial support & importance placed on institutional activity by provincial government	N/A
Provincial and Municipal spending on Labour and Employment	Indicates relative level of financial support & importance placed on institutional activity by provincial and local levels of government	N/A

4. Technical resources: application of technical knowledge, access to information, technology and research

Indicator	Rationale	Operational Definition
Computer Access	Availability and use of computers indicates the speed and ease of access to information as well as the efficiency of inter- & intra-institutional communication practices which contributes to high local institutional capacity	N/A
Business High Tech and Computer Software Applications (i.e.: broadband Internet	Availability and use of high-tech and computer applications indicates the speed and ease of access to information, application of technical knowledge as well as the efficiency of inter- & intra-institutional communication practices which	N/A

access, web conferencing, conference calls, interactive website, etc.)	contributes to high local institutional	
Institutional Research and Development Spending	Indicates application of technical knowledge and investment in research for institutional development	N/A

The capacity to carry out key functions

5. Performance of key functions: provision of services, products, constituency empowerment, contribution to social progress and well-being

Indicator	Rationale	Operational Definition
Education	Presence of employment in education sector indicates the local existence of key institutions to carry out valued functions (i.e.: education and research) as well recruit, train and employ workers which contributes to high institutional capacity	Percentage of workers employed in education at the CCS level
Government	Presence of employment in government indicates the local existence of key institutions to carry out valued functions as well recruit, train and employ workers which contributes to high institutional capacity	Percentage of workers employed in government at the CCS level
Health and Social Services	Presence of employment in health and social service sector indicates the local existence of key institutions to carry out valued functions as well recruit, train and employ workers which contributes to high institutional capacity	Percentage of workers employed in health and social services at the CCS level

The capacity to initiate structural changes & ensure sustainability

6. Governance: legal structure, impact of policies and laws affecting institutional governance and inter-/intra-institutional relations

Indicator	Rationale	Operational Definition
Institutional Internal Reforms	Indicates capacity to govern autonomously and that organizational learning is taking place which is a strong indicator of high institutional capacity	N/A

7. External relations: networks with other institutions and stakeholders, public relations

Indicator	Rationale	Operational Definition
Collaborative Initiatives and Valued Outcomes	Emphasis is given throughout the literature to the importance of networks between institutions and desired valued outcomes which are both strong indicators of local institutional capacity	N/A
Media Representations of Institutional Effectiveness	Indicates how the public perceives (both positively and negatively) the performance of institutions which is also an indicator of local institutional capacity	N/A

8. Sustainability: leadership, institutional autonomy, organizational learning, security of revenue/funding sources, niche management

Indicator	Rationale	Operational Definition
Employee Assessments of Leadership Quality	Interviews or surveys of institutions' employees about the quality of leadership and examples of organizational learning (CPHA; Morgan & Taschereau, 1996; VanSant, 2000)	N/A
Municipal and Provincial Funding	Amount of money municipalities and provinces direct towards institutions is an indicator of local institutional capacity	N/A

To summarize, the formula used for our operational definition of local institutional capacity (LIC) focuses on 7 key indicators and appears as follows:

Table 1:
Local Institutional Capacity Index Formulation

Local Institutional Capacity (LIC) =
+ % of bilingual individuals (CSD level)
+ % with a post-secondary education (CSD)
+ % employed in intellectual and managerial occupations (CCS)
- % self-employed workers (CSD)
+ % employed in education (CCS)
+ % employed in government (CCS)
+ % employed in health and social services (CCS)

Evaluation of the Indicator

This formula to measure LIC uses standardized scores, or *Z* scores[4], in order to calculate this index. The following table presents the general characteristics of CSDs in Canada for the LIC index:

Table 2:
Local Institutional Capacity: Average Characteristics of CSDs in Canada

LIC index	N	Minimum	Maximum	Mean	Std. Dev.
1996	3626	-14.028	17.604	-0.021	3.831
2001	4014	-17.025	17.752	-0.004	3.717

The following table presents a breakdown of CSDs across the provinces and territories of Canada in the LIC index:

Table 3:
Local Institutional Capacity:
Average of CSDs by Province

Province	1996	2001
Newfoundland	0.062	-0.427
Prince Edward Island	-1.861	-0.905
Nova Scotia	0.816	0.667
New Brunswick	1.622	1.181
Quebec	1.160	1.099
Ontario	1.467	0.360
Manitoba	-0.409	0.027
Saskatchewan	-3.651	-3.043
Alberta	-1.875	-1.819
British Columbia	0.888	0.335
Yukon	6.116	7.108
Northwest	7.372	6.614
Nunavut	7.978	8.775
Total	-0.021	-0.004

As we see in the table above, the highest average of local institutional capacity was found in the three territories of Canada. This may be due, in part, to their relatively small population sizes and heavy reliance on government institutions for employment. Nunavut had the highest rate of LIC with CSDs, on average, having an 8.8% level of LIC in 2001. Among the ten Canadian provinces, capacity was highest in New Brunswick with a rate of 1.2% in 2001. The lowest rates of LIC were found in the province of Saskatchewan where CSDs, on

[4] *Z* scores are a special application of the transformation rules. The *Z* score indicates how far and in what direction an item deviates from its distribution's mean, expressed in units of its distribution's standard deviation (Hoffman, 2002).

average, had a –3% level of capacity. This may be the result of the fact that a large portion of Saskatchewan's industry involvement is agriculturally based. Table 4 presents a LIC breakdown of CSDs by Urban/Rural type[5] of CSD:

Table 4:
Local Institutional Capacity: Average of CSDs by Urban/Rural Type

urban area/rural area type	1996	2001
urban core	2.939	3.029
urban fringe	1.933	1.456
rural fringe, in CMA/CA	1.243	1.166
urban, outside CMA/CA	0.603	0.354
rural, outside CMA/CA	-0.759	-0.708
Total	-0.022	-0.008

As we see in the table above, LIC was found to be highest in urban core CSDs. The level of capacity in urban core CSDs averaged 3% in 2001 and was relatively stable over the 5-year period. On the other hand, rural CSDs had the lowest level of LIC. Urban areas tend to have greater access to education, government as well as intellectual and managerial occupations, all of which positively contribute to the LIC index.

One weakness of the index is that is does not include many of the possible indicators mentioned in the literature. Our index is restricted to using Canadian census data supplied to us by Statistics Canada and as a result, many of the institutional level indicators have been omitted from our index.

Future Research

Many indicators of local institutional capacity are institutional level variables. In future, studies may want to be directed towards collection of institutional level information in order to better understand exactly how the inner workings of these institutions and its workers affect capacity. This would also provide a more complete and comprehensive understanding of local institutional capacity. Such an initiative could target quantifiable indicators such as those related to budgetary performance or access to technical resources, given that these should help bolster the existing capacity index. More qualitative analyses of institutional capacity, such as research on inter-institutional dynamics that impede or promote collaboration, would also be extremely worthwhile. While the two approaches present different methodological requirements, both would contribute equally to an assessment of local institutional capacity.

[5] These breakdowns include urban core, urban fringe and rural fringe and distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

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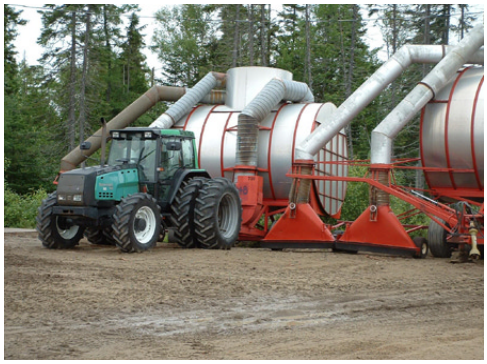



The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

5. Competitiveness

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

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New Rural Economy Project, Phase 2 (NRE^2)

September 2004

The New Rural Economy Project is an initiative of CRRF

Introduction

Competitiveness is a multi-dimensional feature of an economic entity, such as a firm, industry, region, or nation, operating in a market economy that describes its economic performance in relation to other entities. In recent years, the term has become a widely used concept in economic literature and a central research and policy preoccupation of both advanced and developing countries, even though its meaning has remained largely misunderstood (Reiljan, Hinrikus and Ivanov, 2000).

Part of this growing importance of competitiveness stems from the commonly accepted thinking that a nation's economic growth and standard of living is directly linked to the ability of its industries to compete in the global economy. In fact, it has been said that competitiveness can be considered the "key rationale for economic restructuring" (Bollman and Bryden, 1997). Achieving competitiveness has become even more imperative in the context of increasing economic integration and globalization that requires a constant growth of national competitive strength.

Whatever the range of competitiveness considered (local, national or international competition), the capacity of an economic entity to achieve sustained economic growth and improvement in standard of living is viewed as dependent on the extent to which that entity has in place both the requisite macroeconomic, political, legal and social context for development and what Michael Porter (2004) terms "the microeconomic foundations of productivity", defined as the sophistication with which domestic companies or foreign subsidiaries operating in the country compete and the quality of the microeconomic business environment in which they operate. Consequently, in the last twenty years or so, analysis of the complex factors that influence the competitiveness of countries and regions has become a centerpiece of national industrial and economic research agendas.

Definition of Competitiveness

As noted by Kitzmantel (1995), competitiveness is like any other human quality that everybody strives for but is difficult to define and even more difficult to achieve. In a majority of discussions and studies on the subject of competitiveness, the typical approach appears to be focused around the various factors and goals used to measure competitiveness instead of defining the actual concept itself. Thus, some stress a country's low costs or the level of its exchange rate, while others emphasize its technological leadership or growth rate (Boltho, 1996; Fröhlich, 1989). While this is the same approach followed in this report, especially in our operational definition and measurement of competitiveness, it is important to first define theoretically what this concept means.

Reiljan, Hinrikus, and Ivanov (2000) explain that competitiveness reflects a position of one economic entity (country, industry, enterprise, household) in

relation to other economic entities by comparing the qualities or results of activities reflecting superiority or inferiority. It can be defined both in a narrow and in a broader sense. In the narrow approach, competitiveness is explored in conditions where entities' interests are conflicting (i.e. achievement of the aim by one entity makes it impossible for another entity to achieve the same aim). In the broader approach, competitiveness is not considered as a zero-sum game, because an entity's gain does not necessarily come at the expense of others.

There are three levels of competitiveness. The lowest level of competitiveness is the ability of an entity to survive or adapt passively to the competitive environment without significantly changing or developing itself. The medium level of competitiveness is the ability to respond actively to changes in the competitive environment and thereby improve its own qualities and make its activities more efficient. The highest level refers the ability to influence the competitive environment through more efficient operation, quicker development than competitors.

In a sense the narrow approach to competitiveness, stated above, is based on the mercantilist notion that a nation's economic strength is measured by its foreign trade surplus, that imports are undesirable because they displace domestic employment, or that low wages in poor countries are a threat to the growth of rich countries. In this view a country's level of competitiveness is defined by its share of the world market for its products, making competitiveness a zero-sum game as one country's gain comes at the expense of others.

This view of competitiveness is used to justify intervention to skew market outcomes in a nation's favour (so-called industrial policy). It also underpins policies intended to provide subsidies, hold down local wages, and devalue the nation's currency, all aimed at expanding exports. In fact, it is still often said that what makes a nation more competitive are lower wages. However, the world economy is not a zero-sum game. Many nations can improve their prosperity if they can improve productivity. Thus, to understand a nation's or region's competitiveness, the starting point must the underlying sources of its prosperity, which are found in the *productivity* of its economy, as measured by the value of goods and services produced per unit of human, capital, and natural resources. The central challenge in economic development, then, is how to create the conditions for rapid and sustained productivity growth (Porter, 1990; McArthur and Sachs, 2002).

Consistent with the above, the dominant approach in the literature has been to define competitiveness in terms of its ascribed economic goals and the structural, institutional and policy conditions deemed relevant to achieve it. Thus the two most principal international institutions, the World Economic Forum (WEF) and the World International Institute for Management Development (IMD), which publish annual competitiveness index reports, define the concept as follows. The WEF defines competitiveness as "the ability of a country to achieve sustained

high rates of growth in gross domestic product (GDP) per capita", and the IMD defines it as "the ability of a country to create added value and thus increase national wealth by managing assets and processes, attractiveness and aggressiveness, globality and proximity, and by integrating these relationships into an economic and social model" (Garelli, 2003).

Based on the above definitions, the WEF and IMD derive competitiveness indexes that attempt to measure growth and other economic outcomes as determined by various structural, institutional and policy factors. The WEF publishes the *Growth Competitiveness Index* (GCI)[1], a unified index that combines individual indexes on various factors of growth including technological progress, public institutions, and the macroeconomic policy environment. The underlying argument is that a nation's or region's rate of economic growth and standard of living depends upon the contributions of these factors. Thus the GCI aims to measure the capacity of each national economy in achieving sustained economic growth over the next five to ten years (Garelli, 2003). The IMD's competitiveness index, published in its annual *World Competitiveness Yearbook* (WCY), is derived from four factors (past economic performance, government efficiency, business efficiency, and infrastructure), each of which is further subdivided into five factors.

Some economists believe, however, that while stable political, legal, and social institutions and sound macroeconomic policies create the *potential* for improving national prosperity, wealth is *actually* created at the microeconomic level—in the ability of industries and firms to create valuable goods and services using efficient methods. As Krugman (1990; 1994; 1996) argued, it is not countries that compete with one another but rather the firms in those countries that compete. Therefore, the economic competitiveness of a country or region must be defined such that it reflects the competitive strengths of local-level firms and industries. Consistent with this view, the WEF began publishing a supplementary index, called the *Business Competitiveness Index* (BCI), which defines competitiveness in terms of the "sophistication with which domestic companies or foreign subsidiaries operating in the country compete, and the quality of the microeconomic business environment in which they operate" (Porter, 2004).

Indicator Development

Attempting to define competitiveness of a country only on the ground of macroeconomic goals, such as higher growth, could be considered a limited and one-sided approach. It may be argued that countries and regions with them are competing with each other from the aspect of human and social development, including such goals as education, health conditions, equal rights and democracy (*UNDP Human Development Reports* 1991-1998). While on empirical grounds, most of these social objectives may be difficult to include directly in the measure of competitiveness, particular attention should be paid to the issue of

[1] The WEF publishes the *Growth Competitiveness Index* and other related indexes in its annual Global Competitiveness Report (GCR).

employment. A job guarantees that each member of society utilizes his or her abilities in development, while unemployment has such a negative social impact on a country's development that job creation should be included as an indicator in the socio-economic evaluation of competitiveness. The larger implication here is that international competitiveness theory should form links between the broad macroeconomic objectives of growth and open economy, and the human development needs that can influence competitiveness. The case for incorporating employment in the measure of competitiveness is even stronger in the context of rural communities in which most of the populations rely on labour activities.

Based on the above, we have chosen to operationally define the economic competitiveness of a community or region as *the capacity of firms and industries located in it to achieve sustained income and employment growth relative to other communities.* Two related indicators of competitiveness could be derived from this definition: *income* and *employment*. Both indicators are used to provide alternative measures of the competitive strengths of various industries and the regions in which they are located, relative to their counterparts in a country.

Shift-Share Analysis Approach

In order to determine the competitive position of each region, *shift-share analysis* is employed. ***Shift-share analysis*** enables the researcher to isolate the competitive position of a region from the impact on it of national trends and the industrial mix of income or employment that existed in the region at the beginning of the time period being studied. It provides a picture of how well the region's current mix of industries is performing and how well individual industries are doing. The analysis makes it possible to separate income or employment growth into three effects: national growth effect, industrial structure effect, and regional competition effect. Following Barff and Knight (1988), the national growth effect, *N*, is measured as the increase in a region's gross income or employment that will occur if all the industries in the region grew at the same rate as national income/employment. The following equation captures this national growth effect:

$$(1) \qquad N = \sum_{i=1}^{n} (G \times R_i)$$

where *G* represents the growth rate of national income or employment during the period; R_i represents the portion of total regional income or employment in the base year that originates in industry *i*.

The industrial structure or mix effect, I, accounts for the impact of the region's industrial composition. For instance, a region with a high concentration of high growth industries will have a positive industrial mix effect; but a region with a high concentration of low growth industries will have a negative industrial effect. The following equation represents the industrial structure effect:

$$(2) \qquad I = \sum_{i=1}^{n} [R_i \times (G_i - G)]$$

where G_i represents the national growth rate of industry *i* during the period.

The regional competition effect, COM, measures the difference between regional and national industrial growth rates. A positive competitive position implies that, after accounting for national growth trends and the industrial mix of the respective region, the region's economic performance is superior to the average region. The following equation represents this effect:

$$(3) \qquad COM = \sum_{i=1}^{n} [R_i \times (g_i - G_i)]$$

where g_i represents the regional growth rate of industry *i*.

Evaluation of the Indicator

Data on GDP for all Census Sub Divisions (CSDs)[2], estimated from their corresponding provincial Gross Domestic Products (GDPs)[3], were used to illustrate the income indicator using the above analysis. Shift-share analysis can be applied in either a comparative static or dynamic approach. In the static approach, the industry mix at the beginning of the time period is used to calculate the industrial mix effect over the time period under consideration. This method makes little sense if industrial mix changes significantly over the time period, and thus would be of limited value when applied to long time periods. Also, this approach does not account for continuous changes in the size of a region's total income over the time period, since it uses only the initial regional and national industrial growth rates to calculate the growth effects for the period.

The dynamic shift-share approach eliminates these problems by applying the annual national growth rate to the actual regional income at the beginning of that year, thereby calculating the three effects for each and every year of the time period.

The following illustration in Table 1 uses this dynamic approach by computing the three types of effects (national, industrial and competitiveness) for 2001:

[2] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less than 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.

[3] Gross Domestic Product (GDP) data was obtained via the Canadian Socio-Economic Information Management System (CANSIM) and measured at basic prices (using 1997 constant dollars) by the North American Industrial Classification System (NAICS) at the provincial and territorial level for the years 1993 to 2002. The three industrial classifications included in this analysis were: (1) Agriculture, Fishing, Forestry, Hunting; (2) Utilities; and (3) Manufacturing.

Table 1:
Average national growth, industrial mix, and competitive effects on the growth of income of CSDs within Canadian provinces (2001)

Province	Total Growth	National Growth Effect	Industrial Mix Effect	Competitive Effect
Newfoundland	-3.6	2.9	-3.6	-2.9
Prince Edward Island	7.7	1.3	-3.2	9.6
Nova Scotia	37.7	6.3	-3.5	35.0
New Brunswick	18.4	9.1	-4.4	13.6
Quebec	166.5	163.6	28.7	-25.9
Ontario	505.2	211.5	64.9	228.8
Manitoba	14.3	8.7	-24.3	29.9
Saskatchewan	-156.8	12.7	-64.6	-104.9
Alberta	-94.4	19.2	-25.0	-88.6
British Columbia	5.6	32.0	-34.1	7.7
Yukon	0.0	0.0	0.0	0.0
Northwest	-0.1	0.0	0.0	0.0
Nunavut	0.0	0.0	0.0	0.0
Total	83.6	83.6	0.0	0.0

The second column of the above table shows the average total growth of income for CSDs within each Canadian Province and Territory for the year 2001. For example, it shows that for 2001, the typical CSD located in Ontario experienced a total income or output growth of $505.2 million, the highest among all CSD averages in Canada. On the other hand, the typical CSD in Saskatchewan experienced a total decrease in income of $156.8 million, the largest such decrease in economic growth in Canada.

The last three columns of the table indicate the sources of this income growth or decrease. The third column shows the component of the income change for a typical CSD in each province that can be attributed to the growth of the national economy as a whole. For instance, of the $505.2 million income growth obtained in a typical CSD in Ontario during the period under review, $211.5 million is attributed to the *national growth effect*. This means that if the industries we are considering (agriculture, forestry, utilities and manufacturing) grew in Ontario's CSDs at the same rate as their counterparts nationally, then the amount of additional output or income created in these CSDs would be $211.5 million (on average). However, since we know that $505.2 million was created in Ontario in 2001, we need to examine what might account for the additional $293.7 million income. To do this, we turn to the industry mix and competitiveness effects, which are shown in the last two columns of the table.

The *industry mix effect* measures the part of the total income or output growth of a typical CSD that is due to the fact that the national growth rate for industries

concentrated in that CSD is higher or lower than the average national growth rate for all industries. Note that this only means that the types of industries located in the CSD are performing better or worse *nationally* than the average growth rate for all industries in the economy. It does not necessarily indicate the actual performance of those industries within the region itself. The industry mix effect will be positive or negative for a region depending on whether or not that region has a high concentration of high or low growth industries.

Turning to example of Ontario, the results in Table 1 show that the average CSD in this province experienced an industry mix effect of $64.9 million in 2001. This means that the national growth performance of the kinds of industries concentrated in Ontario's CSDs were stronger than the average growth performance for all industries in the national economy. As a result of such industries performing better in Ontario than in the rest of Canada, regional growth in Ontario is positively impacted by $64.9 million in 2001.

However, industry performance only accounts for $64.9 million of the $293.7 million in additional income Ontario CSDs are experiencing. This suggests that the additional income growth of $293.7 million came from somewhere else. In fact, it came from these CSDs' competitive advantage. The *competitiveness effect* measures the ability of the regional economy to capture a growing share of each industry's growth. It measures the regional growth performance of industries located *within* a CSD relative to the performance of such industries nationally. Again, in terms of the Ontario example, it suggests that $228.8 million in regional growth can be attributed to the CSDs competitive advantage over other CSDs in the rest of Canada. This positive competitiveness effect shows that these CSDs gained additional income or output growth over those that can be attributed to national growth and their own industrial structures. If the competitive component were negative, as is the case with Quebec, then these regions would be regarded as less competitive.

The results in Table 1 suggest that on average CSDs in Canada are competitive, except those located in Newfoundland, Quebec, Saskatchewan and Alberta. CSDs located in Ontario are the most competitive. Those CSDs located in Nova Scotia are a distant second. Those located in Saskatchewan are the least competitive, followed by those in Alberta. In terms of the national growth effect, on average CSDs in Ontario benefit the most from growth in the national economy, followed by those in Quebec and distantly by those in British Columbia. Agricultural, fishing, forestry, utilities, and manufacturing industries constitute a mix of low-growth industries for all CSDs, as evident in the negative industry mix effects reported for all CSDs, except for those located in Quebec and Ontario. In spite of this, however, more than half of all CSDs on average were competitive in 2001.

The following table presents a breakdown of a CSD's competitiveness by Urban-Rural status[4] of the CSD:

Table 2:
Average national growth, industrial mix, and competitive effects on the growth of income of CSDs by Urban-Rural type of CSD (2001)

Urban area/Rural area status of CSD	Total Growth	National Growth Effect	Industrial Mix Effect	Competitive Effect
Urban Core	173.6	110.9	43.0	19.7
Urban Fringe	161.9	97.9	27.1	36.9
Rural Fringe, in CMA/CA	102.3	75.9	9.5	17.0
Urban, outside CMA/CA	124.0	96.9	24.6	2.5
Rural, outside CMA/CA	56.8	77.5	-13.3	-7.4
Total	83.2	83.6	-0.1	-0.2

Based on the results in table 2, we see that CSDs located in urban core regions had the largest amount of total growth on average in 2001. However, CSDs located in urban fringe areas were deemed to be most competitive with nearly $37 million of total economic growth attributed to the total growth of the region. On average, urban core CSDs can attribute $110.9 million of their total economic growth to the national growth effect and $43 million to industrial effect.

On the other hand, CSDs in rural areas outside CMA/CAs witnessed the smallest amount of total economic growth and were also found to be least competitive in 2001 (on average). For rural CSDs outside CMA/CAs, $77.5 million of total economic growth can be attributed to the national growth effect while the industrial effect negatively impacted growth by $13.3 million and the competitiveness effect negatively impacted growth by $7.4 million.

Future Research

In future, one might want to include more industries in the development of a competitiveness index. Currently, we are limited to focusing on agriculture, fishing, forestry, utilities and manufacturing due to the lack of available GDP and import/export data at the industry and provincial level. One might also want to expand the national and regional growth, industrial mix and competitive effects indices to include years outside of the current 1993-2002 window that we are working with.

[4] These breakdowns include urban core, urban fringe and rural fringe and distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

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The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

6. Regional Disparity

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

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New Rural Economy Project, Phase 2 (NRE²)

September 2004

The New Rural Economy Project is an initiative of CRRF

Introduction

The term disparity refers to differences in rank, conditions or excellence (Merriam-Webster, 1995). When this term is applied to the socio-economic conditions of regions or territories, the term disparity can be used to describe the "variations in wealth, and socio-economic conditions and opportunities among units of observation (Alasia, 2002). In order to properly measure these variations between regions, geographic concentration indexes are most often used. These indexes are intended to measure the extent to which a small area of national territory accounts for a large proportion of a certain economic phenomenon (Spieza, 2002). Thus, a high concentration index would suggest a high degree of disparity (a few places hold most of the resources), whereas a low index denotes a low degree of disparity (resources are spread out among many places).

There has been a growing discontent with the magnitude of the differences in income and employment opportunity which exist between various regions in the same country: "In the less developed nations especially there is often a widening gap between the growth of a few industrialized urban centres and the stagnation of rural areas, and if not redressed the disparity that results can be a potent cause of political unrest. Though likely to be less extreme, regional differences in prosperity within advanced industrial are also a source of concern (and) Canada is no exception" (Brewis, 1969).

Disparities in income and employment opportunity within Canada have long been one of the important issues for Canadian policymakers. Much attention has been placed on areas where high rates of disparities exist and governments have been increasing efforts to reduce it. Upon identification of regions with high levels of disparity, policymakers may want to consider, or even reconsider, public programs directed at enhancing the performances in these regions (Alasia, 2002). Throughout history, the government has passed special legislation and taken steps to close the inequalities between regions. For instance, a special Area Development Agency (ADA) established in 1963 was designed to assist in the economic development of slow growth areas of the country. The Atlantic Provinces were also given further assistance through the strengthening of the Atlantic Development Board (Brewis, 1969). Even today, 'transfer payments' are annually made to the poorer regions of Canada from the federal government.

Definition of Regional Disparity

Regional disparity is quite evident in all parts of Canada and this trend continues to grow in many areas. How do we define regional disparity, and more importantly, how do we control it? Unfortunately, the issues involved in regional disparity cannot be defined in the narrow sense. Political, sociological, economical and administrative considerations lie at the root of development programs. The need for close collaboration is nowhere more obvious than in problems concerning regional development.

Upon review of existing literature, three key characteristics of regional disparity have emerged:

- First, disparities are linked to the natural conditions and physical characteristics of the region.
- Second, disparities are indicative of an unequal development of production potential.
- Lastly, disparities highlight the great differences in income and living standards from one region to another.

Among the many variables that contribute to regional differences in income and growth, the following have been singled out for discussion: capital formation, the labour force and education, industrial mix and regional exports. There seems to be a high degree of interdependence between these variables. The presence of rich natural resources will encourage investment; investment will influence the industrial mix and levels of employment, and thereby incomes.

Capital Formation (Capital Expenditures per capita) plays a prominent role in most theories of growth and the fact that it is higher in some parts of the country than in others leads one to expect significant regional differences in output. However, it is the technological change embodied in it rather than simply its magnitude that is regarded as significant. Other things being equal, provinces experiencing a lower level of capital expenditures per capita than others over a period of years are also likely to experience lower levels of output and income (Brewis, 1969). On the other hand, capital expenditures are an influence of government policy generally geared towards lower income regions and regions which have less educated and less skilled workers.

Spatial differences in the quality and skills of the labour force also contribute to interregional differences in employment and income. There has been a notable shift to more skilled occupations, accompanied by a great increase in the employment of women. There has been a shift from occupations with low educational requirements to ones with high ones. This trend is a factor in existing spatial disparities in income and employment. The shift away from employment in primary occupations raises the issue of the industrial mix.

The growth of a region reflects the fortunes of the individual industries within its borders. The industrial mix in an area affects not just the level of incomes, but also the distribution and stability of incomes, the growth of the population, and land use. The concentration of production in particular fields of activity that are subject to sharp fluctuations in demand and technological change lead to a higher degree of economic instability. The fact that different regions are competing against each other may hurt one region at the expense of the other, leaving a disparity between the regional exports.

Measurements of regional disparity have also been conducted comparing gross national product (GNP) per capita using the Gini Index of Inequality (Gylfason, 1999). When applied to incomes, the Gini coefficient measures the degree of disparity in an income distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. A value of 0 represents perfect equality whereas a value of 100 represents perfect inequality.

In brief, a great deal of the literature deals with international analyses of regional disparity. Generally, researchers have utilized four principle measurements of geographic concentration:

1. Concentration Ratio
   This measurement simply takes the ratio between the economic or production weight of a region and its geographic weight (Spieza, 2002). The economic weight of a region has been measured in terms of production or gross domestic production (GDP), income or employment. This measurement is best suited for international comparisons of regional disparity.

2. Locational Gini Coefficient
   This measurement is simply a modification of the Gini inequality index where individuals are replaced by regions and weights are determined by regional shares in total population or employment (Krugman, 1991; Spieza, 2002). This method is widely used but Gini coefficients have also been criticized for confusing inequality and concentration when they, in fact, two distinct concepts (Arbia, 1989; Spieza, 2002; Wolfson, 1997).

3. Herfindahl Geographic Concentration index
   Developed by Ellison and Glaeser (1997), this measurement is a slight reformulation of the original Herfindahl index. The Herfindahl index has been called the one true measure of geographic concentration (Spieza, 2002). This index takes into account the regional differences in size. The formula appears as follows:

   $$EG = \sum_{i=1}^{N} (y_i - a_i)^2$$

   Where y_i is the production, income, or employment proportion of region *I* and N stands for the number of regions being compared; and a_i is the area of region *i* as a proportion of the country area. If the production share of each region equals its relative area, then there is no concentration and EG equals 0 indicating no regional disparity.

The EG index is the sum of all *N* squares for the entire nation. It indicates the extent to which there is employment disparity among these *N* regions. Note that each of these squares would be a decimal number or a fraction, and the EG index is also most likely to be a decimal or fractional number. Thus, to apply this formula to calculate the proportion of regional disparity that is contributed to the total by each region, the ratio of the square $(y_i - a_i)^2$ to EG is used. The formula would appear as follows: $(y_i - a_i)^2$ / EG.

4. Adjusted Geographic Concentration index (AGC)
This measurement essentially transforms the Herfindahl index in order to take into account intra and international differences in the size of regions. This index is best suited for international comparisons of geographic concentration. The formula appears as follows:

$$AGC = GC / GC^{MAX}$$

where $CG^{MAX} = \sum_{i \neq \min} a_i + 1 - a_{\min} = 1 + 1 - 2a_{\min} = 2(1 - a_{\min})$ is the maximum value of the CG index, reached when all production, income, or employment is concentrated in the region with the smallest area, and $a_{\min}$ is the relative area of the smallest region (Krugman, 1991; Spieza, 2002).

Indicator Development

Based on the literature review, we have determined that the Herfindahl Geographic Concentration index, developed by Ellison and Glaeser, is the best way to measure regional disparity. This index was found to be the most sensitive measure when it comes to the level of aggregation of regional data. This feature is a result of the fact that the "differences between production share and relative area of each region are squared" (Spieza, 2002). We have chosen employment share as the best indicator of production for the region. GDP data at the regional level is not available to us for this analysis and income data is often problematic with misrepresentation and missing data found in many smaller areas. In addition, the rate of employment will often account for large portion of the differences between incomes between regions (Brewis, 1969).

In order to generate this index, we first have to determine the appropriate area and employment shares of each CSD[1] in Canada. To determine the area share, the total land area (in square kilometres) for each CSD was divided by the total land area (in square kilometres) for all CSDs in Canada. To calculate the employment share, the total labour force (all classes of workers 15 years of age

[1] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less than 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.

and older, male and female) of each CSD was divided by the total labour force of all CSDs in Canada.

In order to measure regional disparity, each CSD's area share (in square kilometres) of the country is subtracted from the CSD's total employment share and then squared. The statistical procedure of squaring the differences between the employment share and the relative area share of each CSD, makes all these values positive.

To summarize, the formula to measure the overall degree of regional disparity in Canada is as follows:

EG of Canada = SUM (CSD total employment share – CSD total area share)^2

In order to calculate the proportion of total regional disparity contributed by each CSD we use the following formula:

CSD contribution to Regional Disparity = (CSD total employment share – CSD area share)^2/EG of Canada

The following example will illustrate how this measure of regional disparity is calculated:

If we had 5 regions or CSDs in Canada, with the following employment shares and area shares:

	1	2	3	4	5	Total
y	0.3	0.2	0.1	0.3	0.1	1.00
a	0.4	0.2	0.1	0.1	0.2	1.00

then, the overall regional disparity index (EG) for these five regions would be:

EG = $(.3-.4)^2 + (.2-.2)^2 + (.1-.1)^2 + (.3-.1)^2 + (.1-.2)^2$ = .01 + 0 + 0 + .04 + .01 = **.06**
To compute the disparity contribution of region 1, we calculate the ratio: $(.3-.4)^2$ / .06 = .01/.06 = .1667
To compute the disparity contribution of region 2: $(.2-.2)^2$ / .06 = 0 / .06 = .0000
To compute the disparity contribution of region 3: $(.1-.1)^2$ / .06 = 0 / .06 = .0000
To compute the disparity contribution of region 4: $(.3-.1)^2$ / .06 = .04 / .06 = .6667
To compute the disparity contribution of region 5: $(.1-.2)^2$ / .06 = .01 / .06 = .1667

As illustrated in the example above, region 4 makes the greatest contribution to the overall regional disparity, followed by regions 1 and 2. This means region 4 has contributed about 67 % of the regional disparity for the entire country, while regions 1 and 2 each contribute about 17 %. Even though this region is one of the smallest regions in terms of geographic area (only 0.1 or 10%), it enjoys 30% or 0.3 employment share. Thus, its contribution to overall regional disparity was found to be the highest.

For the Canadian case, we examined 4039 CSDs in 1996 and 4014 CSDs in 2001 with populations of greater than 250 people. This produced an overall Herfindahl Geographic Concentration index total of .043 for 1996 and .045 for 2001. These statistics provide us with our overall index of regional disparity.

Contributions of CSDs to the Regional Disparity Indicator

Each CSDs contribution to the overall regional disparity was calculated and the results were multiplied by 100 for each of the years. This was done in order to reduce the number of zeroes in the results since each CSD makes such a small contribution to the overall index for Canada. The average contributions of CSDs to the regional disparity index for Canada appear in Table 1:

Table 1:
Average CSD Percent Contribution to Regional Disparity

Regional Disparity	N	Minimum	Maximum	Mean (%)	Std. Dev.
1996	4039	0.0000	21.5097	0.0248	0.5312
2001	4014	0.0000	23.2232	0.0249	0.5579

As we see in Table 1, on average, CSDs contribute about .024% to the overall level of regional disparity in both 1996 and 2001. This level of regional disparity has changed very little over the 5-year period.

The next table presents a breakdown of the CSD contribution to regional disparity index by urban-rural type of CSD[2]:

Table 2:
Average CSD Percent Contribution to Regional Disparity by Urban-Rural Status

Urban area/Rural area type of CSD	1996	2001
Urban core	0.0361	0.0848
Urban fringe	0.0012	0.0013
Rural fringe, in CMA/CA	0.0001	0.0004
Urban, outside CMA/CA	0.0001	0.0001
Rural, outside CMA/CA	0.0270	0.0259
Total	0.0218	0.0251

The table above indicates that urban core regions contribute most to Canadian regional disparity and the contribution is growing. Urban core areas contributed .036% in 1996 and that number rose in 2001 to .084%. This is most likely due to the fact that they have such a large proportion of the labour force in a relatively

[2] Urban core, urban fringe and rural fringe distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

small area. Rural areas outside CMA/CA regions also contribute a relatively large proportion to disparity, but in their case it is due to the fact that they are large areas with a very small proportion of the labour force. Urban areas outside of census metropolitan areas contributed the least to overall regional disparity.

The following table presents the average levels of contribution to regional disparity at the CSD level by province:

Table 3:
Average CSD Percent Contribution to Regional Disparity by Province

Province	1996	2001
Newfoundland	0.0064	0.0072
PEI	0.0000	0.0000
Nova Scotia	0.0038	0.0036
New Brunswick	0.0002	0.0001
Quebec	0.0094	0.0100
Ontario	0.0870	0.0903
Manitoba	0.0308	0.0093
Saskatchewan	0.0125	0.0138
Alberta	0.0161	0.0178
BC	0.0132	0.0137
Yukon	1.6551	1.6593
Northwest	0.0000	0.0000
Nunavut	0.0000	0.0000
Total	0.0248	0.0249

As we can see in this table, the Yukon Territory contributes the most to the overall regional disparity in Canada. Ontario made the next highest contribution, most likely due to its high levels of labour force participation in relatively small CSDs. The province of PEI, Canada's smallest province, made the smallest contribution to regional disparity among the ten provinces indicating a relatively even balance of space and labour force participation.

Future Research

This approach to regional disparities takes the all of Canada as its point of reference and considers the extent to which each CSD contributes to an overall measure of regional disparity. Future work needs to be done in which other spatial units are taken as the point of reference: provinces, regions, and CSDs themselves. Using a similar approach, it would be possible to calculate Herfindahl indexes for each of these units – focusing on the extent to which variation occurs within them.

Future studies might also examine a wider variety of characteristics to more adequately reflect other aspects of regional disparity. This set of indicators could better "capture the multiplicity and complexity of the underlying spatial

processes" (Alasia, 2002). For instance, one might want to include income and GDP along with employment in a more comprehensive set of indicators to measure regional disparity. Extending the analysis to characteristics such as family structure, ethnicity, or housing would provide insights on the changing social nature of Canadian society.

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The Canadian Rural Revitalization Foundation

Seven Reports on the Identification of Rural Indicators for Rural Communities

7. Resource Reliance

Prepared for the Rural Secretariat
of Agriculture and Agri-Food Canada

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New Rural Economy Project, Phase 2 (NRE^2)

September 2004

The New Rural Economy Project is an initiative of CRRF

Introduction

Resource reliance refers to the relationship between social and natural resource systems. It reflects the extent to which the social system is reliant on one or more natural resources. Resource reliance can be defined as the proportion of activity in the resource sector activities that contribute to an area's total basic economic activity (Korber et al., 1998). Resource sector activities include agriculture, forestry, logging, mining and oil and gas related industries.

Research indicates that reliance on natural resources tends to contribute to the economic well-being of a region (Stedman et al., 2004). Economic well-being indicators include poverty, unemployment and income. However, many studies have found that the type of resource industry has a profound impact on the degree of well-being produced. For instance, Overdest and Green found that pulp and paper mills provide higher per capita incomes whereas other industries such as logging and sawmills were not associated with any trend in higher per capita incomes (Parkins et al., 1995).

Further, the effects of resource dependency on economic as well as social well-being were shown "much variation even within a single industry" (Stedman et al., 2004). Among numerous other factors, geography may also play a substantial role. For instance, the logging industry may have very different implications for communities in British Columbia than communities in New Brunswick.

Several early studies have even found that natural resource-reliant communities have suffered many negative outcomes as a result of their high concentration of natural resource activities. However, the type of industry seems to also play a significant role since these differences varied across each resource industry. For example, some researchers have found that forest sector reliant communities have higher rates of unemployment, poverty, divorce and even higher crime rates. While on the other hand, mining communities were found to have few differences in terms of these social and economic indicators (Stedman et al., 2004).

The impact, of natural resource reliance on communities is well documented and its effects are wide-ranging, whether positive or negative. In fact, many "resource-based communities today are full-fledged communities in their own right, with extensive local health and educational services along with local retail and business services" (Parkins et al., 2003). Communities will often identify themselves by their concentration in a natural resource and even build their entire community around this resource involvement.

In any case, identifying which communities tend to be more reliant on natural resources than other communities is a very important objective. It will serve to identify which communities have a higher concentration of resource reliance than others. As a result, measures can be adopted to protect and enrich natural

resources in these areas or increase the economic diversity of the communities in order to maintain and improve sustainability.

Definitions of Resource Reliance

Resource reliance indexes measure the importance of natural resources to the social and economic well-being of a region. Several different approaches have been utilized to measure resource reliance. The majority of studies have focussed on three specific employment, production and income-based measures:

1. Total Employment Income
   This measure has been utilized to determine resource reliance in several studies. In this index, reliance is calculated using employment income from resource-based industries as the total proportion of employment income in a region. In this case, employment income for an industry is measured as: the number of people employed in the industry, multiplied by the average income for the industry (Leake, 2002).

2. Industry Employment
   This is the most common approach to measure resource reliance. In this index, reliance is calculated using industry employment in resource-based industries as the total proportion of industry employment in a region. Essentially, the number of people employed in resource-reliant industries is divided by the total labour force of a region.

3. Production
   This approach has been used by Natural Resources Canada and defines resource reliance in terms of a region's economic base. The degree of resource reliance of each region is determined by the percentage of commodities produced by a selection of resource industries as compared to all commodities produced by the region. In this case, regions that were found to be at least 50% reliant on a particular natural resource were labelled as resource-reliant communities.

Indicator Development

We have opted to measure resource reliance in terms of industry employment since it provides the most direct and easily accessible approach. For this analysis, we will rely on Statistics Canada census data and use the three-digit Standard Industrial classifications (SIC)[1] for natural resources for 1996 and the

[1] The 1996 industry data were produced according to the 1980 Standard Industrial Classification System (SIC). This classification consists of a systematic and comprehensive arrangement of industries structured into 18 divisions, 75 major groups and 296 groups. These industrial groups are based on the general nature of the establishment's business, industry or service (Statistics Canada, 2004).

North American Industrial Classifications System (NAICS)[2] codes for 2001 have been used.

Although these classification systems are very similar in nature, we must caution against direct comparisons between these two census years. The natural resource industry categories include:

Natural Resource Industries for 1996 and 2001

1996	2001
Agricultural	Agricultural, Forestry, Fishing, Hunting
Fishing and Trapping	Mining, Oil and Gas Extraction
Logging and Forestry	
Mining, Quarrying, Oil and Gas	

In order to create an index to measure resource reliance, we have taken the total number of persons employed in the industries listed above and then divided this number by the total labour force for each census sub-division (CSD)[3] in Canada. Results from the index are represented as percentages and can range from 0% to 100% with 0% meaning absolutely no resource reliance is present in a CSD (no people are employed in the resource industries listed above) to 100% meaning completely resource reliant CSD (all people are employed in those industries).

Evaluation of the Indicator

The following table indicates the average amount of resource reliance for all CSDs in Canada:

Table 1:
Resource Reliance: Average Characteristics of CSDs in Canada

	N	Minimum	Maximum	Mean	Std. Dev.
1996	4058	0	97.14	17.86	17.29
2001	4014	0	92.19	16.49	16.46

[2] The 2001 industry data were produced according to the 1997 North American Industrial Classification System (NAICS). The NAICS provides enhanced industry comparability among the three North American Free Trade Agreement (NAFTA) trading partners (Canada, United States and Mexico). This classification consists of a systematic and comprehensive arrangement of industries structured into 20 sectors, 99 sub-sectors and 300 industry groups. The variable 'Industry' (based on the 1997 NAICS) does not permit direct comparison to any previous census industry data (Statistics Canada, 2004).

[3] A census subdivision (CSD) is the general term for municipalities (as determined by provincial legislation) or an area treated as municipal equivalents for statistical purposes (Statistics Canada, 2004). Geographic boundaries are based on 2001 Statistics Canada census definitions. CSDs with populations of less than 250 people have been excluded from this analysis since the values become unreliable due to confidentiality transformations.

The resource reliance index has been applied to 4058 CSDs in Canada in 1996 and 4014 CSDs in 2001. Based on the table above, we see that on average, CSDs in Canada had 17.9% of their workforce employed in resource-reliant industries. In 2001, this percentage dropped slightly to 16.5% indicating a slight decrease in resource reliance in Canada over the 5-year period.

Table 2 presents the resource reliance index breakdown by the 10 Canadian provinces and 3 territories for 1996 and 2001:

Table 2:
Average Resource Reliance per CSD by Province

Province	1996	2001
Newfoundland	15.41	15.72
PEI	21.74	20.92
Nova Scotia	10.67	10.85
New Brunswick	12.42	11.71
Quebec	13.70	12.73
Ontario	9.00	7.94
Manitoba	22.80	20.38
Saskatchewan	37.17	35.01
Alberta	20.29	18.22
BC	14.68	12.64
Yukon	12.94	7.42
Northwest	10.26	10.51
Nunavut	9.74	2.91
Total	17.86	16.49

From the results in table 2, we see that CSDs in the province of Saskatchewan had the highest degree of resource reliance. On average, more than one-third (35%) of their employment is reliant on natural resources in 2001 down slightly from 37.2% in 1996. This finding is most likely due to Saskatchewan's heavy reliance on agricultural based activities.

Ontario CSDs had the lowest rate of resource reliance among the 10 Canadian provinces with an average of slightly less than 8% in 2001 and 9% in 1996 of their employment reliant on resources. The majority of the workforce in the province of Ontario is made up of secondary and tertiary industry workers and relies relatively little on primary industries such as agriculture, fishing and logging.

Nunavut territory actually had the lowest rate of resource reliance in Canada in 2001 with less than 3% of their workforce reliant on natural resources. This is most likely due to Nunavut's geographic location in the north of Canada and their cold climate which both make it difficult for natural vegetation to flourish. At the same time, mining operations tend to employ relatively few workers.

The following table presents a breakdown of resource reliance by urban-rural type[4] of CSD:

Table 3:
Resource Reliance by Urban-Rural Status

Urban/Rural Type of CSD	1996	2001
Urban Core	3.18	3.09
Urban Fringe	5.85	5.75
Rural Fringe, in CMA/CA	11.27	10.10
Urban, outside CMA/CA	10.41	9.54
Rural, outside CMA/CA	23.06	21.07
Total	18.28	16.56

From table 3, we see that rural CSDs, outside CMA/CA, represent the highest average of resource-reliant activities with 21% of the rural workforce reliant on natural resources in 2001. This figure has actually decreased by more than 2% over the 5-year period. Not surprisingly, urban core CSDs had the lowest percentage of resource reliance with an average of slightly more than 3% of employment in urban core CSDs reliant on natural resources in both 1996 and 2001. This concentration of resource reliance in rural areas is due to the fact that these areas tend to have greater access to natural resources than do urban areas. Urban areas are more concentrated in secondary and tertiary industries such as business, administrative and manufacturing.

Future Research

In future, research in the area of resource reliance should focus on more indicators than simple employment and income breakdowns. One may want to examine some environmental indicators that measure the actual amount of natural resources that are being extracted from the area. For example, the percentage of available forest in square kilometres or hectares used for logging or pulp each year. Resource reliance can also be broken down into three main categories: agriculture, fishing and logging and examined at each of these three levels independently. All three of these resources are very unique and have very different implications for both the environment and the population.

[4] These breakdowns include urban core, urban fringe and rural fringe and distinguish between central and peripheral urban and rural areas within or outside of a census metropolitan area (CMA) or census agglomeration (CA) (Statistics Canada, 2004).

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