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Economic Indicators of Sustainable Forest Management:
Theory versus Practice

Wiktor Adamowicz[1]

Introduction

The assessment of progress towards sustainability through the use of indicators has been the focus of many forest management and environmental agencies worldwide. Many countries have developed and report on their own set of "Criteria and Indicators" (C&I) and forest certification schemes almost always involve the use of indicators as measurements of sustainability. Most of these indicator schemes have 3 "pillars"; environmental, social and economic. That is, the sets of indicators include ecological indicators, social indicators and economic indicators. The implicit notion is that sustainability on these three axes will result in some form of overall sustainability.

In the economics literature there has also been a significant amount of effort devoted to defining sustainability and developing ways to measure sustainability (e.g. Heal, 1999; Nordhaus and Kokkelenberg, 1999). The sustainability of forest resources, as a component of the set of resources and a contributor to economic activity has also been examined (e.g. Vincent, 2000; Vincent and Hartwick, 1997; Kriström 2001 (cited in Kriström and Skanberg); Kriström and Skanberg, 2001). In most cases economists adopt the concept of adjusted economic accounts as measures of sustainability. Vincent (2001) illustrates that national green account measures (and genuine savings measures) provide a good indicator of future economic "performance" of a country. Forest accounts are one subset of natural resource accounts and it is generally accepted that forest accounts be incorporated with other accounts to construct overall measures of sustainability. The challenges associated with measuring timber outputs, non-timber outputs and outputs associated with ecological services (as well as depreciating or appreciating productive capacity in these sectors) are well recognized but the conceptual framework continues to be to assess sustainability in terms of net national wealth or net national product (Heal and Kriström, 1998).

[1] I thank Peter Boxall and Marty Luckert for their excellent comments on previous versions of this paper. They helped me clarify my comments significantly and very much improved the document. As usual, however, all errors are my responsibility.

Given the relative level of agreement in the economics discipline with the use of wealth or product based assessments of sustainability, why do the indicator systems employed by countries, certification schemes and other agencies not also employ such schemes? When one examines the criteria and indicators promoted by the Montreal process or the Helsinki process one finds a very different array of economic indicators and an array that is not well linked to the underlying ecological aspects of the situation. In this paper I provide an overview of indicator systems as currently applied in forest management. I contrast these indictors with those that are developed in the economics literature. It appears that the divergence between the types of indicators arises from different concepts of sustainability and/or definitions of welfare / well-being. In addition, it appears that while conceptual economic indicators focus on integrating ecological and economic information into single indicators, the practice criteria and indicators literature keeps these items separate. I offer some reasons for the difference between these sets of indicators and then conclude with a set of recommendations for future development of indicators that better integrate the economic science underlying indicators and the concerns being implicitly voiced in the development of indictor systems in use today.

Economic Indicators of Forest Sustainability

Economists have been very active in the debate and discussion about sustainability indicators. The concept of sustainability favored by economists is the notion that welfare is not declining over generations. This definition is a "wide-sense" definition in that welfare is defined over market and non-market goods and services. Nordhaus and Kokkelenberg (1999)state that "sustainable national income is defined as the maximum amount that can be consumed while ensuring that all future generations can have living standards that are at least as high as that of the current generation" (p. 185). This suggests a form of accounting that examines "utility" or "consumption" over time. Such measures of consumption are then augmented by growth (investment) or depreciation of the capital stock.

Vincent (2000) summarizes the theory behind the use of "green accounts" as follows. Utility is assumed to arise from consumption of a variety of goods and services over time or

$$U = U(c_1(t), c_2(t), c_3(t), \ldots c_n(t)) \qquad (1)$$

The market value of consumption provides a measure of the well being arising from purchased goods and services and while not a measure of utility, provides an indicator of the degree of well

being. Equation 1 in principle would be modified to include nonmarket commodities when they are relevant to the measurement of consumption and utility. Thus, leisure activities, home production and unpaid labor (child care, etc.), and environmental services could be included in the measurement of consumption if an appropriate set of shadow prices could be used to convert these activities into values. Given these estimates of value, several measures of "wealth" can be developed. Wealth could be based on utility or consumption (see Ashiem, 2000 for a discussion of the differences between such measures). Sustainability could also examine wealth (present value of consumption) or income measures could be used for the assessment (Heal and Kriström, 1998). These measures of sustainability depend on assumptions about technology and the discount rate.

Given a choice of a metric for assessing sustainability one must determine how to examine the metric empirically. Typically sustainability metrics have been examined using some form of adjusted Net National Product (or Green NNP). A form of Green NNP (Vincent 2000) is

$$G(t) = c(t) + q(t)\dot{k}(t) \qquad (2)$$

where G(t) is the measure of Green NNP, c(t) is consumption, k(t) is the rate of change of capital (positive for investment or appreciation, negative for depreciation) and q(t) is a measure of the price of capital. This measure of Green NNP only corresponds to a measure of wealth under several simplifying assumptions including no technological change and inclusion of all market and nonmarket goods (Vincent, 2000; Asheim, 2000). As an alternative to Green NNP, Genuine Savings estimates can also be used to identify the investment a society makes in natural and other forms of capital (see Vincent, 2001).

Summaries of discussions of sustainability concepts and indicators include Pezzy (1992), Pezzey and Toman (2002) and Nordhaus and Kokkeleberg (1999). Pezzey and Toman suggest that a significant degree of confusion continues to exist in the literature regarding sustainability concepts and empirical measures of sustainability. The assumptions of no trade, no technological change and full accounting for externalities leads to the finding that current market prices can be used in developing sustainability indicators. Under such assumptions the *output-sustainability correspondence principle* (Nordhaus and Kokkelenberg, 1999) arises and provides the parallel between NNP (Net National Product) and sustainable income. While such assumptions make it possible to use market information to build sustainability indicators, these assumptions are also certainly rejected in practice. Sustainability assessments that weaken these assumptions are far

more difficult to construct in practice and rely on much more sophisticated empirical analysis (Pezzey and Toman, 2002). Therefore, most empirical analyses continue to employ these simplifying assumptions.

Within the area of forest resources, the main concern is to assess the depreciation or appreciation in the forest asset and to account for nonmarket consumption aspects arising from the forest resource. However, it should be noted that assessing the sustainability of the forest sector in isolation may provide little information on overall sustainability. Equation (2) includes all forms of capital, including several forms of natural capital. In addition it should be clear that the economic indicator integrates biological and economic information. The economic indicator is built upon knowledge of the biophysical dynamics of the natural capital as well as the economic dimensions. The development of bio-physical accounts, and improved understanding of the linkage between bio-physical and economic processes is necessary for the development of economic accounts. Let us first turn to the assessment of depreciation or appreciation that corresponds to the adjustment in Green NNP associated with the right hand side of equation (2). For the forestry case when one accounts for potential for growth in the resource, the measure of change in value (for timber resources) can be represented as (Vincent 2000; Nordhaus and Kokkelenberg 1999):

$$\Delta V_t = (p_t - MC_t)(g_t - h_t) \qquad (3)$$

where the first term is price minus marginal cost and the second term is net growth minus harvest (or quantity consumed). Several assumptions are lurking behind this expression. First, prices are assumed to be exogenous and "correct" for the sustainable path. Second, the growth or appreciation used in most empirical work does not take into account the age class structure of the forest. The latter can be accounted for by adjusting the growth terms to include the impacts of different age classes within the forest (Nordhaus and Kokkeleberg, 1999). However, the former provides a very challenging problem, especially given the public nature of many forests and the degree of intervention in markets for forest products.

The assessment of depreciation / appreciation of forest assets presents problems for the would-be forest sustainability assessor, but the inclusion of nonmarket goods and services presents even more significant problems. First, there is the potential for double counting of benefits arising from nonmarket values because of the multiple linkages between market and non-market goods and services (Vincent and Hartwick, 1997). Second, one can fall into the trap

of attempting to define the value of all natural systems without focusing on the welfare economic measure of the value of a change (Kriström and Skanberg, 2001). In other words, it makes little economic sense to attempt to define the total value of ecosystem services, rather, the impact of a specific change in ecosystem services should be the focus of analysis. In forest resource accounting we are typically seeking to translate nonmarket goods and services into market analogues and value the consumption of these goods and services at their *marginal* values or prices. A myriad of techniques exist for the assessment of such values (Nordhaus and Kokkelenberg, 1999; Kriström and Skanberg, 2001). Most measures provide *average* or *total* value rather than marginal values and there is considerable controversy regarding the accuracy of some of the measurement approaches. For example, valuation techniques used in recreation demand often generate total values of recreation sites, or values associated with user days. However, these may not be very close to the marginal values for accessing the recreation site that one should use in economic analysis. In addition, nonmarket valuation in the absence of bio-physical information on quantities and environmental changes is impossible and often we have limited physical information on nonmarket goods and services. Finally, nonmarket values associated with environmental goods and services are often very sensitive to spatial considerations (ecosystems, spatial configurations of nonmarket opportunities like recreation sites, etc.). This makes it very difficult to transfer economic values associated with these goods and services between sites, countries or regions. This also means that measures of value translated to a "per unit area" basis and transferred to "new" region are usually meaningless as they are devoid of information on the specific environmental and human characteristics in the new setting.

There are several examples of forest resource accounts that include some nonmarket goods and services (Hultkrantz, 1992; Haener and Adamowicz, 2000; Kriström and Skanberg, 2001). One of the few examples of forest resource accounting that examines market and nonmarket accounts over time is Kriström and Skanberg, 2001. In their study they define the value of the capital stock of timber and nontimber goods (berries, etc.) and define the depreciation in the capital stock arising from environmental change. This change in asset value is the appropriate value to include in Green NNP. They compute measures analogous to the appreciation / depreciation in timber accounts. Similarly, recreational trips are valued at what they assume to be marginal values per day (prices). This study provides one of the most carefully

constructed market and non-market accounting exercises. It is clear, however, that several critical assumptions regarding physical and monetary measures had to be made in order to develop the accounts.

Summary

The economic sustainability literature illustrates that there are many theoretical and empirical challenges in the development of indicators of sustainability. Nevertheless, there is general agreement on the concept of sustainability. The research revolves around refining the theory supporting indicators and improving the measurement approaches. A few key findings arising from this review are relevant to those interested in sustainable forest management. First, it has been clearly identified in the sustainability literature that assessing sustainability for a single sector (such as forestry) is problematic. Economic assessments of forest resources should aim to find ways to incorporate forest capital and nonmarket values arising from forests into more general systems of accounts. The degree to which indicators from individual sectors can stand alone and be considered measures of sustainability is questionable (Nordhaus and Kokkelenberg, 1999). Second, the issue of spatial scale is a difficult problem in economic sustainability assessment. From a theoretical standpoint, the issue of spatial scale enters in the assessment of trade effects on measures of welfare. The simple measures employed in current Green NNP ignore trade effects. Open economy adjustments to measures of welfare are discussed in Pezzey and Toman (2002) but in general make the analysis more complex. The issue of spatial scale will arise later in this paper in the broader discussion of sustainability indicators. Third, accounting for nonmarket goods and services is important for economic sustainability measures, but care must be taken to ensure that these values are assessed properly. The literature contains examples of double counting and welfare measures that are inconsistent with economic theory. Fourth, the underlying concept of sustainability is an integrated one where ecological relationships are critical for the development of economic accounts. The notion of separate ecological, social and economic accounts are not the focus, rather, economic analysis attempts to integrate these elements to the best degree possible. This does not mean that the development of physical accounts is of low value, indeed the physical accounts are necessary for the development of economic accounts.

While there are clearly weaknesses in economic measures of sustainability significant progress has been made in the past two decades. Important theoretical and empirical work remains to do be done to augment traditional accounts with values of environmental goods and services and natural capital measures, but there is a significant degree of consensus on the appropriate way to proceed. I now turn to the assessments employed in sustainable forest management initiatives to examine the compatibility between economic sustainability concepts and the measures of economic sustainability used in such practices.

Criteria and Indicator Systems for Sustainable Forest Management

Criteria and indicator (C&I) systems have emerged as the dominant paradigm for measuring progress toward sustainable forest management. While there is considerable debate about the origins of this paradigm - in particular, debate about which agency began using the C&I framework; it is clear the C&I have penetrated the policy and management environments. The 1992 Earth Summit led to a meeting in Montreal, Canada in 1993 at which discussion was held on the use of indicators in measuring sustainability of forest regions. These discussions spawned the Helsinki process (European C&I process) and later the Montreal process (Non-European forested countries) for the use of C&I. These early international systems set the stage for national level indicator systems like the Canadian Council of Forest Ministers (CCFM) C&I Framework.

Probably the most significant impact that C&I schemes have had is on the development of certification systems. Systems like the International Forest Stewardship Council initiative (http://www.fscoax.org/), or the national Sustainable Forestry Initiative (SFI) (http://www.afandpa.org/forestry/sfi/menu.html) or the Canadian Standards Association (http://www.sfms.com/csa.htm#about) system all employ some form of indicator framework. For example, the SFI in the U.S. contains approximately 75 core indicators while the FSC program in the U.S. has over 150 indicators (see http://www.merid.org/comparison/FSC_SFI_Comp_Analysis-Exec_Summary.pdf for a comparison of FSC and SFI programs) . The CSA framework (http://www.sfms.com/csa.htm#about) follows the general guidelines set out by the CCFM and relies on local level modification of the CCFM national criteria and indicators. A variety of similar schemes for monitoring and continuous improvement exist worldwide.

It is instructive to examine the pattern of indicators within these C&I schemes. Each of the schemes in operation today has the following general criteria (in various forms and combinations):

- Biological diversity
- Forest health or integrity
- Forest productivity
- Ecosystem services (water, soil, carbon)
- Socio-economic benefits
- Legal, policy and institutional framework

For example, the Canadian C&I system includes the following 6 criteria (Canadian Council of Forest Ministers, 1997).

- Conserving Biological Diversity
- Maintenance and Enhancement of Forest Ecosystem Condition and Productivity
- Conservation of Soil and Water Resources
- Forest Ecosystem Contributions to Global Ecological Cycles
- Multiple Benefits to Society
- Accepting Society's Responsibility for Sustainable Development

These 6 criteria arrange themselves into 4 predominately ecological criteria, 1 economic criterion (multiple benefits to society) and 1 social criterion. While the criteria are often described as ecological, economic and social it is clear that elements of the ecological criteria (biodiversity, ecosystem services, ecosystem productivity) are very relevant to the determination of economic sustainability as defined above. The C&I systems attempt to "untangle" elements of the forest resource and assess each element rather than build an integrated indicator system.

One can take a "glass half full" stance on C&I systems and suggest that they are attempts to develop the data required for an integrated assessment of sustainability. Indicators supporting forest productivity and forest integrity are certainly aspects of g(t) in equation (3). Area of forest is required for assessments of g(t) as well. The state of biodiversity, soil / water quality and the contribution to ecosystem services (carbon, nutrient cycling, etc.) can be considered attempts to expand c(t) in equation (2) to consider nonmarket elements, although this is a subset of all nonmarket elements and this list is probably among the most difficult to value. The indicators discussed under socio-political criteria attempt to capture items that are beyond economic indicators including social processes (forms of democracy and representation), social capital and

collective elements that contribute to well being. Finally the set of indicators that should be most closely linked to economic indicators appear under the criterion of socio-economic benefits or multiple benefits. Indicators under this criterion include market and nonmarket values, and a host of other economically related indicators. Thus, one could take the view the C&I for sustainable forest management "loosely" correspond with economic views of sustainability, except for the notions of social elements that go beyond traditional economic analysis.

If one examines typical C&I systems more closely, however, it becomes more difficult to see the correspondence between economic sustainability and C&I systems. Let us first examine a typical set of indicators generated in the "socio-economic benefits" category. The indicators used in the Montreal process, referred to as Criterion 6 or, "The maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies" include (a subset of the list of indicators):

- *Production and consumption*
    - o Value and volume of wood and wood products production, including value added through downstream processing.
    - o Supply and consumption of wood and wood products, including consumption per capita.
    - o Value of wood and non-wood products production as percentage of GDP.
- *Recreation and Tourism*
    - o Number of visitor days attributed to recreation and tourism, in relation to population and forest area.
- *Investment in the forest sector*
    - o Value of investment, including investment in forest growing, forest health and management, planted forests, wood processing, recreation and tourism.
    - o Level of expenditure on research and development, and education.
- *Cultural, social and spiritual needs and values*
    - o Area and percent of forest land managed in relation to the total area of forest land to protect the range of cultural, social and spiritual needs and values.
    - o Non-consumptive use forest values.
- *Employment and community needs*

- Direct and indirect employment in the forest sector and the forest sector employment as a proportion of total employment.
- Viability and adaptability to changing economic conditions, of forest dependent communities, including indigenous communities.

(Roundtable on Sustainable Forests, 2002)

At least two issues arise that separate C&I systems from economic sustainability analysis. The first is that C&I systems include a focus on the sustainability of the forest sector (industry, employment, etc.). In economic analysis this is usually not the issue of concern. The contribution of the forest sector to overall consumption and welfare is relevant, but it is overall welfare that is important in economic frameworks. Along these lines most C&I systems suggest that maintenance of employment or industrial capacity is an indicator of sustainability. In some cases it may not be feasible or economically viable to do so. Such indicators do not consider the interplay between technological change, inter-industry dynamics, markets and welfare. Furthermore, they do not attempt to integrate ecological elements with economic elements. It is possible that this isolation of "economic" from "ecological" indicators is a response to the complexity of the integration process (as those researchers developing natural resource accounts have discovered!). However, it could also be an attempt to include different values into different indicators (ecological versus economic).

A second dimension in which C&I systems differ from economic approaches is in their focus on the communities of people living in forested areas. The welfare of individuals in these regions is placed under the spotlight and is isolated from the overall well being of the rest of society. In many cases the people living in the forested areas are indigenous peoples, or perhaps poorer peoples, suggesting that a focus on this particular group is warranted. However, there are many links between people in forested regions and people outside of forested regions through exchange, migration, and other aspects of economic life. Just as the analysis of the sustainability of a sector (forestry) can be problematic in terms of measuring overall sustainability, so can the analysis of a subset of the population. C&I systems suffer from problems of "scale" in that analysis of subregions (of population) or single sectors of the economy individually do not tell us what we need to know about overall sustainability. One could imagine that focusing on forests alone would contribute to knowledge about natural capital and could aid in an analysis of strong

sustainability (that is – sustainability of forest as one form of capital). However, this is probably not the case with an analysis of "forestry" rather than forests.

It is rather clear that there is not a 1-to-1 correspondence between sustainable forest management C&I systems, specifically economic sustainability indicators within these schemes and conceptual economic sustainability measures. However, C&I systems are probably trying to measure different concepts of sustainability. By including employment, economic diversity, and other measures they are attempting to assess some forms of well-being in forest based communities. While one can question the merits of such metrics when looking at C&I schemes from a national perspective, for forest companies with defined forest areas being evaluated for certification the level of well being of the communities within their license areas is a matter of concern. Certification schemes like FSC require an assessment of the welfare of the "local communities" and whether these communities are involved, benefit from the resource (in market and nonmarket terms) and are improving along some welfare scale. The degree to which forest management operations can affect such outcomes is variable (or even questionable in some cases) but it often remains part of the company's responsibility to address these "social and economic" concerns.

The objective of C&I systems can be considered in another light. They are attempting to evaluate well-being of forest based communities in a broader (or at least different) sense than traditional economic analysis. By including employment, economic diversity and income equality measures they appear to appear to be measuring notions of "development" rather than sustainability. However, other economists have recently begun to explore alternative metrics of well-being. Frey and Stutzer (2002) in their recent *Journal of Economic Literature* article describe "happiness" as a metric of well being and examine the response of "happiness" to traditional economic metrics (income or consumption) as well as employment, inequality, and other elements that do not typically enter into economic accounts. Frey and Stutzer identify linkages between "happiness" and environmental quality as one of the outstanding issues on the research agenda. Such an analysis would certainly fit in the forestry case either in the assessment of the impact of nonmarket goods and services on "happiness" or on the relationship between proximity to environmental assets and "happiness. Assessment of "happiness" in relation to social concepts would also be interesting and may provide some link between participation, democratic process, institutions, empowerment and well-being. One could say that the creators

of C&I systems, perhaps unknowingly, have taken on the task of broadening the concept of welfare. They go beyond the traditional economic correlation of utility with consumption (including market and non-market goods) and introduce various individual (employment) and social (equity, social capital) notions of utility.

One can paint a picture of C&I systems as attempting to describe complex welfare metrics beyond sustainability, however, this still does not alleviate the problem of conducting such analyses for a single sector and specific communities. Indeed, it becomes difficult to determine the unit of analysis for such work – which communities are included in the examination of forest-based indicators? Therefore, while the inclusion of such indicators is intriguing, the merits of such a scale of analysis remain questionable.

An additional issue that arises from the examination of C&I systems is that these systems will likely result in change in behavior by the agents involved in forest management. Since indicators will be used to assess performance (e.g. through certification), they will ultimately be used by firms to develop practices and management policies. This may be a good characteristic of C&I schemes, however, the benefits of such characteristics depend on the definitions of the indicators. If the indicators are "true" indicators of sustainable forest management then we can be pleased that these signals are finding their way to the change forest management. However, if the indicators are not actual indicators of SFM, but are a heuristic of some form, firms responding to the indicator may be moving away from sustainable forest management. Including employment in the forest sector, for example, may signal firms to maintain employment levels even when inefficient to do so. This is clearly not the way toward sustainable forest management. In addition, it is possible that indicators in the C&I approaches are "manipulable". That is they will be in part determined by agents who will then use them as performance indicators. This is a rather undesirable practice if the indicators are manipulated to make firms, provinces or countries "look good" in terms of indicators but not really be on the path to sustainable forest management. Such manipulation is less likely with practices like resource accounting. There is a long history of maintaining arms length relationships between national income accounting agencies and politicians / firms. If this tradition is continued, the resource accounts will remain an "objective" measure of sustainability[2].

[2] I thank Marty Luckert for helping identify and clarify this issue.

Economic Sustainability – Suggestions for Future Development

Theoretical concepts surrounding the economic indicators of sustainable forest management differ from those used in practice in Criteria and Indicators schemes in at least two fundamental ways. First, theoretical concepts attempt to integrate ecological systems with the economic "indicators" of sustainability. Resource accounts or Green GDP measures, or any other form of environmentally adjusted economic indicator, is an attempt to integrated knowledge of change in ecological condition or depreciation into the economic measure. The physical or ecological accounts must be constructed before the economic account can be. In the case of C&I systems the economic indicators are separated from the ecological indicators.

The second major deviation between conceptual measures of economic sustainability and those used in practice is the measurement of a variety of "indirect" measures of community well being in C&I systems. The inclusion of employment levels and economic diversity indexes, for example, deviates from the conceptual notion of sustainability as non-declining well being as measured through consumption and investment. There are linkages or correlations between these measures, but it is clear that current C&I systems are attempting to assess the well being of forest based communities (rather than economies as a whole) and are treating such measures as indicators of sustainability even though they are not necessarily related to the natural capital stock or the value of nonmarket goods. Such community-based measures also clearly vary by the scale chosen for analysis (community, region, province / state, etc.).

Much of the use of indictors like employment and economic diversity arises from the notion that economic sustainability is defined as the "maintenance" or sustainability of the economic conditions of the community of interest. This concept is clearly at odds with the conceptual notion of economic sustainability examined by resource economists. Sustained employment rates may have little to do with non-declining well-being, especially when one includes market and nonmarket values. A clearer focus on developing environmentally adjusted economic indicators (like green NNP) would be beneficial for the assessment of sustainability. Effort in this direction will require additional theoretical and empirical research, and will require interaction with scientists in other disciplines, but is the only way to develop the integrated assessments required to assess sustainability. Furthermore, components of green NNP could be projected into the future through simulation or optimization tools and used to assess forest policy or management alternatives.

While developing estimates of green NNP should be the focus for economists interested in sustainable forest management, there should also be continued research on broader notions of well being. The economic definition of well being encapsulated in NNP has been a long standing one, yet it has always been challenged. Other measures of well being may provide additional insights into human – environment interactions and improved assessments of our progress toward sustainability. There is also merit in examining disaggregate measures of well being where possible. Assessment of the distribution of income is common. However, assessment of the level of well being for forest based versus non-forest based regions could provide additional insights into regional development policies and resource management policies.

Finally, it is worth noting that the "scale" of assessment of sustainability is very important. Measurement of sustainability of the forest resource is a reasonable concept in terms of the recognition of the potential for appreciation / depreciation of this capital asset and for recognition of the nonmarket values often arising from forest resources. Measurement of sustainability of the forest "sector" is more problematic. Sustainability of a single economic sector does not necessarily contribute to sustainability overall. Similarly, sustainability of a community in terms of employment or population is not necessarily linked to sustainability of a country or society in general. This is not to say that characteristics of communities are not important to the assessment of sustainability. Perhaps a measure to strive for is one where elements of well being that are affected by changes in community size, structure, or other "social capital" factors are captured in new, improved measures of environmentally and socially adjusted economic accounts and that accounts at "local" levels be aggregated into regional, provincial and national levels..

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