

# "Urban Sustainability Reporting"

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## Editors' Introduction

One of the main questions facing those interested in bringing about more sustainable communities is: how do we recognize progress toward sustainability? Some method of measuring the direction of current trends and success or failure of particular initiatives is crucial. This is not a new topic within urban planning – performance measurement and evaluation techniques have been around for years – but the subject takes on a new urgency when the aim is to radically change current ways of developing cities and to justify substantial new initiatives. Indicators can also be extremely useful in educating the public about the direction of current trends, and in developing political support for change.

For such reasons sustainability indicators have become one of the central tools for sustainable urban development. Examples range from Sustainable Seattle's community-based indicator set, developed by a group of citizens who convened public meetings with local leaders in the mid-1990s, to the United Nations' Human Development Index, developed by a large international agency relying on national-level data from 125 countries. (For further information on both of these, see [www.sustainableseattle.org](http://www.sustainableseattle.org) and [www.undp.org](http://www.undp.org).)

The following review of sustainability indicator approaches by Canadian planner Virginia Maclaren is excerpted from the *Journal of the American Planning Association* (62(2), pp. 184–202). The author teaches at the University of Toronto and has also written on topics of waste management and regional economics. Here she emphasizes the distinctive characteristics and types of sustainability indicators. For further examples of local, regional, or national indicator programs, interested readers might refer to the website of the International Sustainability Indicators Network (ISIN), [www.sustainabilityindicators.org](http://www.sustainabilityindicators.org). Other helpful resources include Maureen Hart's *Guide to Sustainable Community Indicators* (North Andover, MA: Sustainable Measures, 2001; available from [www.sustainablemeasures.com](http://www.sustainablemeasures.com)), the World Resources Institute's publication *Environmental Indicators* (Washington, DC: World Resources Institute, 1995), Simon Bell and Stephen Morse's book *Sustainability Indicators: Measuring the Immeasurable?* (London: Earthscan, 1999), and *Towards Sustainable Development: Environmental Indicators* (Paris: Organization for Economic Co-operation and Development, 1998).

The concept of sustainability is starting to have a significant influence on planning and policy at the local level. Previous research has identified numerous examples of urban sustainability initiatives in

North America. A certain number of communities are starting to adopt sustainability as a goal in comprehensive plans and other planning activities (Maclaren 1993, Oullet 1993, Beatley 1995). Now,

the important next step for sustainability initiatives at the local level is to determine whether or not these actions are leading a community to become more sustainable. A significant barrier to accomplishing this task is the absence of a clearly articulated method of reporting on urban sustainability.

Urban sustainability reports include a range of information about environmental, economic, and social conditions and policies in the local community and use that information to make judgments about whether the community is making progress towards sustainability. Evidence of positive progress is important for justifying past expenditures on sustainability initiatives and building support for new initiatives. Evidence of a lack of sustainability can provide ammunition for community groups in local government, other levels of government, or the private sector. Individuals in the community also can use sustainability reports to educate themselves about sustainability trends and evaluate how their own actions may improve sustainability.

The purpose of this paper is to present a structured process for urban sustainability reporting that improves upon the *ad hoc* reporting processes currently in use, and to explore some of the characteristics of urban sustainability indicators. In researching this paper, I examined some of the first efforts at urban sustainability reporting in North America and Europe and drew on local experiences with related types of reporting, namely state of the environment reporting, healthy city reporting and quality of life reporting. State of the environment (SOE) reports describe and analyze environmental conditions and trends of significance. Social or economic conditions are discussed only insofar as they relate to the biophysical environment (Campbell and McLaren 1995). Thus SOE reporting is not broad enough to be called sustainability reporting. In contrast, healthy city reporting has just as broad a focus as sustainability reporting, but with a much stronger emphasis on human health. (See, for example, Healthy City Toronto 1993.) Quality of life reporting has evolved to the point where it, too, has become very similar to sustainability reporting in that it examines economic, environmental, and social conditions and the linkages among them (e.g., Murdie *et al.* 1992); but quality of life reporting does not have the same concern for issues of intergenerational equity.

The examples of urban sustainability reports that are referred to in this paper come from three different levels of government: (1) the city of Seattle, Washington; (2) the Regional Municipality of Hamilton-Wentworth, Ontario; and (3) the province of British Columbia. Each of these cases is described briefly below.

Sustainable Seattle is the name of a multi-stakeholder group that was established in 1990 as a volunteer network and civic forum for the promotion of community sustainability. It is administered by the local YMCA and governed by an independent board of trustees. In 1993, the group released an urban sustainability report for Seattle containing 20 sustainability indicators and an evaluation of Seattle's progress towards sustainability (Sustainable Seattle 1993). An additional 20 indicators were released two years later. The target audience for the report was primarily individual members of the community and the media, with businesses and local government being a secondary target.

The Sustainable Community Indicators project in the Regional Municipality of Hamilton-Wentworth, Ontario, is a continuation of the region's Sustainable Community Initiative, which began in 1990. At that time, the Regional Council appointed a citizen's Task Force on Sustainable Development with a mandate to examine the concept of sustainable development as a basis for reviewing all regional policies. In 1992, after consultation with over 400 individuals and 50 community groups, the Task Force released a document entitled "Vision 2020," describing the type of community that Hamilton-Wentworth could be in the year 2020 if it followed the principles of sustainable development (Regional Municipality of Hamilton-Wentworth 1992). As a follow-up to this document, the Council launched the Sustainable Community Indicators project in 1994, with the goal of developing sustainability indicators for measuring the region's progress towards Vision 2020. The output of the project will be an annual report card that identifies the status of the indicators as well as the way in which they can be influenced by individuals, organizations, business, local government, and the community as a whole.

The British Columbia Round Table's State of Sustainability Report examines urban sustainability at the provincial level. The Round Table is a

multi-stakeholder group, funded by the provincial government, and was responsible for developing the province's first sustainability strategy. For its urban sustainability report, the Round Table chose a sample of five cities, accounting for over 60 per cent of the province's population, to represent the broad regions of the province as well as a variety of economic, environmental, and social conditions. The report, containing over 90 urban sustainability indicators, was released in 1994 (British Columbia Round Table 1994). Like the Hamilton-Wentworth initiative, the British Columbia report is meant to be a guide for both modifying personal behavior and informing planning and policy decisions. . . .

## DEFINING URBAN SUSTAINABILITY

What is the meaning of the term "urban sustainability"? It may help to first compare it to "sustainable urban development." The meanings of these two terms are very close and are often used interchangeably in the literature (cf. Richardson 1994). One way of distinguishing them, however, is to think of sustainability as describing a desirable *state* or set of conditions that persists over time. In contrast, the word "development" in the term "sustainable urban development" implies a *process* by which sustainability can be attained.

Some of the key characteristics of urban sustainability that are often mentioned in the literature and in policy documents are: intergenerational equity, intragenerational equity (including social equity, geographical equity,<sup>1</sup> and equity in governance), protection of the natural environment (and living within its carrying capacity), minimal use of nonrenewable resources, economic vitality and diversity, community self-reliance, individual well-being, and satisfaction of basic human needs.<sup>2</sup>

There is considerable debate within the academic community, planning agencies, and other organizations over the relative importance of each of these urban sustainability characteristics, and there is even disagreement on whether all of them should be included when developing sustainability goals. Almost everyone who has tried to define urban sustainability agrees, however, that the concept points to the necessity of introducing environmental considerations to the policy debate over the future of our cities. Some maintain that environmental

considerations should now be paramount in this debate, while others call for a more holistic approach that balances environmental, economic, and social concerns.

For the purposes of urban sustainability reporting, I contend that there is no single "best" definition of urban sustainability, since different communities are likely to develop slightly, or even significantly, different conceptualizations of urban sustainability, depending on their current economic, environmental, and social circumstances and on community value judgments. As a consequence, a set of indicators designed to measure progress towards achievement of one community's sustainability goals may not necessarily be appropriate for measuring progress in another community. Nevertheless, there are certain fundamental properties of sustainability indicators that all communities will wish to consider. These are described in the next section.

## WHAT IS AN URBAN SUSTAINABILITY INDICATOR?

One definition of urban sustainability indicators is that they are "bellwether tests of sustainability and reflect something basic and fundamental to the long term economic, social or environmental health of a community over generations" (Sustainable Seattle 1993: 4). This definition provides a good starting point, but it requires considerable elaboration. Looking first at the "indicator" component of "urban sustainability indicators," it is important to remember that most indicators are simplifications of complex phenomena. The term "indicator" should therefore be taken literally in the sense that it provides only an indication of conditions or problems (Whorton and Morgan 1975, Clarke and Wilson 1994). Since a single indicator will seldom be able to give the full picture, it is often useful to employ a wide range of indicators to characterize the different dimensions or aspects of a situation. Unfortunately, this requirement can conflict with the need to identify a fairly limited set of indicators for purposes of decision-making, and to minimize double-counting.

Urban sustainability indicators can be distinguished from simple environmental, economic, and social indicators by the fact that they are:

- integrating
- forward-looking
- distributional
- developed with input from multiple stakeholders in the community.

All sustainability indicators should possess the last characteristic. It may not be possible to develop individual sustainability indicators that possess all of the first three characteristics, but they should possess at least one, and within a given set of sustainability indicators, all of these characteristics should be represented.

### Integrating indicators

Sustainability indicators are integrating in the sense that they attempt to portray linkages among the economic, environmental, and social dimensions of sustainability. One example of an integrating indicator might be the amount of "brownfield" land found in an urban area. This could be considered both as an indicator of industrial activity loss and as an indicator of environmental constraints on redevelopment (if the lands are contaminated). Still another integrating indicator would be the unemployment rate, since it is a measure of both economic stress and social stress.

One of the integrating indicators used by Sustainable Seattle is the number of salmon returning to spawn in a representative sample of local salmon runs. This indicator is relevant for both an environmental condition (water quality) and an economic vitality condition (survival of one of the Seattle area's most important industries).

Composite indicators, which combine two or more individual indicators, can also be useful as integrative indicators. For example, the cost of recycling per ton of waste recycled is a simple composite indicator that integrates economic and environmental considerations. Unfortunately, the construction of more complex composite indicators faces a number of methodological problems, including such issues as deciding how to weight the individual indicators, how to standardize different measurement units, and whether to choose a multiplicative or additive aggregation technique (Ott 1978, Innes 1990). Despite these problems, some composite indicators, such as the Human

Development Index,<sup>3</sup> have gained considerable popularity because they reduce the information contained in several individual indicators down to a single number.

### Forward-looking indicators

A second important characteristic of sustainability indicators is that they must be forward-looking if they are to be used in measuring progress towards achieving intergenerational equity. There are several different ways in which an indicator might be considered forward-looking. The simplest type of forward-looking indicator is a "trend indicator." A trend indicator describes historical trends and provides indirect information about future sustainability. For example, it is often obvious from examining historical trends that a development path followed in the past cannot possibly be sustainable into the future. However, because trend indicators provide only indirect information about the future, they are more useful for reactive than for proactive policy-making (Ruitenbeek 1991).

The forward-looking capabilities of trend indicators can be enhanced if they are linked to reference points that define intermediate or final steps in the move towards meeting sustainability goals. The two main types of reference points are targets and thresholds. Whereas targets are levels that must be met in the future if sustainability is to be achieved, thresholds are levels that should not be exceeded. Thresholds are scientifically determined and may possess regulatory status. Examples include air and water quality standards. Targets can be set in a fairly arbitrary manner either by using easily recognized numbers (e.g., reduce solid waste by 50 per cent by the year 2000), by comparison to higher order jurisdictions (e.g., national or state means), or by norms (e.g., the poverty level). A threshold, such as an air quality standard, also can be part of a target (e.g., zero exceedances of the standard by the year 2020).

The Oregon "benchmarks" are a well-known application of the use of targets for reviewing government accountability. In 1991, the Oregon Progress Board released its first benchmarks report, in which it identified 272 indicators of environmental, social, and economic well-being in that state (Oregon Progress Board 1991). The Board also

specified a series of targets for each indicator, to be met at regular intervals up to the year 2010. They referred to these targets as benchmarks. The indicators in the report are primarily output indicators (e.g., number of households with drinking water that does not meet government standards) rather than input indicators (e.g., expenditures on water treatment facilities), and are being used to help set a broad range of program and budget priorities.

Both targets and thresholds are present in the Netherlands' national environmental policy indices. Each index has one or more policy targets set for specified future dates (e.g., the years 2000, 2010), and in some cases the index includes a longer-term "sustainability level" that is scientifically determined. For example, the Eutrophication Index, which measures releases of phosphates and nitrogen compounds to the environment, will reach a sustainable level when the excessive supply of phosphates and nutrients has been reduced enough that a balance has been achieved between supply and the removal from the environment of these two major contributors to eutrophication (Adriaanse 1993).

Another type of forward-looking indicator is the "predictive indicator." Predictive sustainability indicators rely on mathematical models for the future state and development of variables describing the environment, the economy, and society, or the linkages among them. Population levels and population growth are commonly used predictive indicators found in planning reports. Bratt (1991)

notes that since all predictions are inherently disputable, the best that predictive indicators can do is to provide plausible information about future conditions. Only trend indicators provide scientifically reliable information, assuming that the data collection methods were reliable.

The uncertainty inherent in predictive indicators points to the need for a third type of forward-looking sustainability indicator known as the "conditional indicator." Conditional indicators depend on a form of scenario development; they answer the question: "If a given indicator achieves or is set at a certain level, what will the level of an associated indicator be in the future?" This type of indicator attempts to overcome the difficulty that predictive indicators have in forecasting, by developing a range of forecasts or predictions. Table 1, taken from the British Columbia Round Table's State of Sustainability Report (1994), provides an example of a conditional indicator of urban form. The "if" indicator is future residential density. The "then" indicator is the total amount of land that will be needed to accommodate the expected urban population of British Columbia in 2021 at each of these density levels. Two different measures of the land-area indicator are presented: the amount of land in hectares and the equivalent amount of land currently occupied by the City of Vancouver. The former measure may be most useful for planners, and the later measure is probably more meaningful to the general public.

Housing (units per hectare)	Area needed for housing (hectares)	Area needed for other urban functions	Total area needed (hectares)	Density* City of Vancouver equivalents
1.4	479,000	240,000	719,000	64
2.3	290,000	145,000	435,000	38
6.5	103,000	52,000	155,000	14
9.5	70,000	35,000	105,000	9
18	37,000	19,000	56,000	5

**Table 1** Land area needed for cities to serve additional British Columbia residents in the year 2021 at various residential densities

Source: BC Round Table on Environment and Economy (1994).

Note: \*From lowest to highest, these are the current densities, respectively, for the City of Kelowna, the City of Cranbrook, Greater Victoria, Greater Vancouver Regional District, and the City of Vancouver.

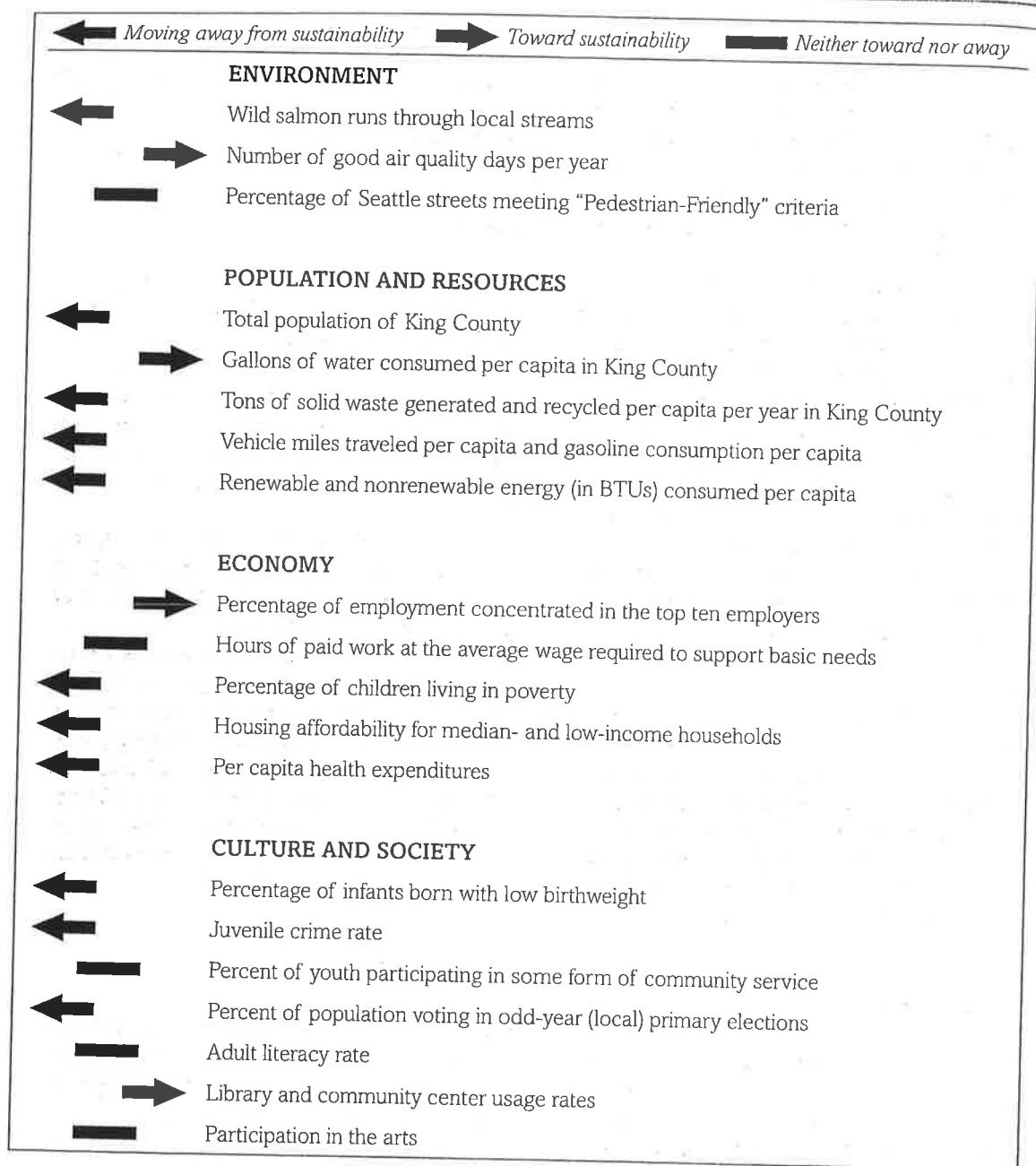


Figure 1. Sustainable Seattle indicators.

Source: Sustainable Seattle (1993).

## Distributional indicators

Sustainability indicators must be able to measure not only intergenerational equity but also intra-generational equity. They should be able to take into account the distribution of conditions (social, economic, environmental) within a population or across geographic regions. Typically, spatially aggregated indicators fail to account for distributive effects. An example is GNP, which may increase even though economic conditions for many groups or different regions in the country are declining (Liverman *et al.* 1988). Disaggregating certain indicators for a community by such factors as age, gender, and location can help to overcome this problem.

Sustainability indicators should also be able to distinguish between local and nonlocal sources of environmental degradation, and between local and nonlocal environmental effects. A downstream community may generate very little pollution and display all the characteristics of a sustainable community – except for the fact that it suffers from significant upstream water pollution or upwind air pollution. The development of indicators that can identify pollution sources outside the local community's control will facilitate the formulation of appropriate policy responses to geographical inequities. Similarly, sustainability indicators should also measure the extent to which a local community contributes to environmental degradation in other communities, regions, or the world at large.

## Multi-stakeholder input

A final characteristic that distinguishes sustainability indicators from other types of indicators is the manner in which they are developed. The history of the social indicator movement suggests that the most influential, valid, and reliable indicators have been those that were developed with input from a broad range of participants in the policy process (Innes 1990). This lesson is especially applicable to the development of sustainability indicators, since sustainability is such a value-laden and context-sensitive concept. It therefore makes sense to seek input on sustainability concerns and priorities from a broad range of stakeholders. This can be accomplished by assigning significant responsibility

for selecting sustainability indicators to a broadly-based, multi-stakeholder group or by consulting in some other way with multiple stakeholders from the earliest stages of indicator development.

## NOTES

- 1 Geographical equity is a term coined by Haughton and Hunter (1994) to emphasize the undesirability of achieving economic growth of a higher quality of life in one community at the expense of environmental degradation in another. They assert that this form of development is inequitable unless some form of reparation or compensation takes place between the communities.
- 2 See, e.g., Alberta Round Table 1993, Jacobs 1991, Hardoy *et al.* 1992, Richardson 1992, British Columbia Round Table 1994, Haughton and Hunter 1994, Beatley 1995.
- 3 The Human Development Index was developed by the United Nations Development Program (UNDP) for comparing human welfare levels in different countries. The index is an aggregation of four indicators: life expectancy at birth, adult literacy, average years of schooling, and GDP per capita. The UNDP publishes the Index for all members of the United Nations in its annual "Human Development Report."

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