Introduction

Sustainable Regional Development

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This issue of the Canadian Journal of Regional Science highlights what appears to be one of the most important development concepts to be introduced in the last few decades, Sustainable Regional Development. What exactly is sustainable regional development? Is it really an important development concept or simply a vague, diffuse abstraction of questionable applicability?

There is little question that definition and measurement of sustainable development have proved elusive, although some would argue that the strength of the term lies in its ambiguity because it recognizes that development is spatially and temporally unique (and constructed). The more cynical among us might claim that it is a term invented by big business, their idea being that it would take the environmental community at least two decades to figure out its meaning, and we could proceed with business as usual. But despite the critics, all must recognize that sustainable development, as a planning concept, now pervades discussions of environment and development from boardrooms to classrooms. However, even those of us who support the concept of ecologically sustainable development, at times feel uncomfortable with the uncritical acceptance of the term and, in turn, its implications. The regional science community should be playing a major role in this debate; unfortunately, it has been notably quiet and ineffectual. This special issue is an attempt to stimulate regional scientists to become more active in the discussions and analyses required by the adoption of sustainable development as a planning goal. Included are a diverse group of papers which outline the theoretical, conceptual and analytical issues involved in the present debate. These papers present a
mixture of reviews, conceptual articles and empirical studies to provide
regional scientists with a sense of the breadth of the literature and its impor-
tance to the regional science community. I hope it will also offer enough of a
stimulus to entice more regional scientists to work in the sustainable develop-
ment area.

The term sustainable development had its origins in the 1972 Stockholm
Conference on Environment and Development. This conference was important
in recognizing the key linkage between environment and development objectives,
and was pivotal in promoting greater awareness of this linkage. However,
explicit recognition of sustainable development as the guiding principle
of all development was not popularized until the publication of Our Common
Future the report of the World Commission on Environment and Development
(1987) (the so-called "Bruntland Report" named after the chair of the Commis-
sion, then Norwegian Prime Minister Gro Harlem Bruntland). This report,
and the subsequent debate over the definitions of sustainable development, sustain-
ability, sustainable economic development and the like, has stimulated an
enormous literature and the concept has now become the accepted "buzz word"
of the 1990s, despite its ambiguous meaning. The Commission defined sus-
tainable development as "...development which meets the needs of present
generations without sacrificing the ability of future generations to meet their
needs." This is a very simple concept, it seems, and one which is intuitively
appealing to almost everyone. But what does this definition mean? Should we
not use any nonrenewable resources? Is any additional carbon dioxide in the
atmosphere unacceptable?

When asked to define this term, I generally draw on six key principles of
sustainable development adopted by the Ontario Roundtable on the Environ-
ment and the Economy to support the simple definition given by the Bruntland
Commission. These are: intergenerational equity, full cost pricing, anticipation
and prevention, informed decision making, living off the interest, and empha-
sizing quality of development over quantity.

1. **Intergenerational Equity**
Explicit in the Bruntland definition is the notion of intergeneration
equity, but not simply from an anthropocentric focus. Not only
must the total stock of natural and human capital be non-declining
over time (this issue -- natural versus human capital -- is the
source of much debate in the newly emerging field of "ecological
economics"), but essential ecological processes must be maintained
as well.

2. **Full Cost Pricing**
Although an old argument in the economics literature, full cost
pricing is, nevertheless, a key principle for sustainable develop-
ment. All costs, including environmental, social and resource
depletion costs, must be included -- or internalized -- in all cost
accounting. This issue is part of a larger policy literature which
revolves around the "polluter pays principle".

3. **Anticipation and Prevention**
This principle represents a number of subtle, but crucial, issues.
Individuals, institutions and firms must be held accountable for
their actions. We must deal with the underlying causes of prob-
lems (which will require more structuralist approaches to analysis)
while recognizing that these are individual and cumulative
impacts.

4. **Informed Decision Making**
Decision making should reflect the interests and needs of all stake-
holders in the process. This necessarily implies the need for de-
centralized decision making, a movement towards consensual
decision making and direct access to policy making by multi-stake-
holder groups, etc.

5. **Living off the Interest**
We must treat our "national assets" as we do capital goods, recog-
nizing that they depreciate and need to be replaced. Consumption
must be limited and materials recycled. More importantly,
 depletion of non-renewable resources must be balanced with our
ability to produce renewable substitutes.

6. **Quality of Development Over Quantity**
Future development must focus on more environmentally con-
scious consumption patterns, energy efficiency, product durability
and a more efficient spatial distribution of activities.

While these principles are useful in augmenting the discussion on the
definition of sustainable development, the key issue which needs to be
addressed and, therefore, the key challenge for our society, is, unquestionably,
how to attain a more equitable society, nationally, internationally, and inter-
generationally.

• Equity within nations -- ensuring a more equitable distribution of
productive assets and better opportunities for women and the
dispossessed.

• Equity across nations -- narrowing the gap between the richest and
the poorest nations which has increased over the past twenty years.
These are all useful guiding principles for achieving a sustainable society. But how can we measure sustainable development? Or, if we are unable to measure sustainable development, how do we know when we have achieved a sustainable society? And why the focus on sustainable regional development? This last question is the easiest to answer. Although the generic definition of sustainable development implies no spatial uniqueness, the application of the term -- and the principles noted above -- does vary considerably by region. Since development is historically and spatially constructed, the element of space in any analysis of sustainable development is crucial. As important, natural environments are regional in nature (for example, airsheds, watersheds, etc.). In British Columbia, the province is divided into eco-regions and eco-districts. Sustainable development must be defined, and applied, according to a specific spatial context.

The measurement of sustainable regional development, however, is more problematic, and reflects the themes of many of the papers presented in this issue. To date, most of the empirical work has focused on either developing indicators of sustainable development (of various types) or natural resource accounting, which ranges from physical based sets of information accounts to incorporating natural resource depletion in systems of national accounts. Prior to any decision on indicators versus accounts, or any measurement and analysis, the issue of information systems for sustainable development must be addressed. The major constraint to the application of sustainable development concepts is one of information; problems include the use of different metrics, the lack of measurement, and inconsistent spatial units. Walter addresses the question of information systems in the first article in this issue, and concludes that without an appropriate information system in place, planning processes aimed at achieving sustainable development will be ad hoc in nature and oriented toward past problems rather than future needs.

One information system which has received much publicity in recent years is natural resource accounting, particularly at the national level, where the emphasis has been on expanding the UN System of National Accounts to include natural resources. Much of this interest has been on developing "green GNP" measures both as comprehensive information systems and to assist in changing our perceptions -- and measurement -- of national wealth. This work has a considerable inheritance from the ecological input-output analysis done by Isard, Leontief, Daly, Cumberland, Victor and others in the early 1970s. In some cases, environmental accounts can be incorporated into input-output models and used for impact assessment purposes. Prudham and Lonergan present a review of natural resource accounting models in this issue, and develop a model for regional based accounting at the sub-provincial level in British Columbia. In another article, Butterfield and Kubursi demonstrate the applicability of incorporating environmental satellite accounts into a provincial input-output table and use this technique for estimating the economic effects of waste management strategies in Ontario.

One of the key problems facing modellers in the early 1970s, that has remained unresolved, is the need to value ecosystem services and processes. The measurement question is intertwined with the issue of valuation. Most of the recent work in this area has focused on indicators: of environmental change, of sustainable development, of human development, etc. As Manning illustrates in his paper, the problems in measuring the value of ecological services is one of the key constraints to the further development of resource accounting. He draws on five years of experience with a wetland evaluation project to reveal the problems in deriving functional relationships for ecosystem processes. Another aspect of the valuation question is the problem of cumulative effects. Under the principle of anticipation and prevention noted above, individual and cumulative effects must be considered. This has led to the notions of "cumulative environmental change" and, correspondingly, "cumulative effects analysis", which attempt to assess the cumulative impacts of development projects. In his paper, Cocklin emphasizes the inadequacies of present conventional approaches to environmental assessment and management and the need to incorporate cumulative effects analysis in any consideration of sustainable development. While there is a need to further develop methods appropriate to the task of measuring cumulative environmental change, it is crucial that cumulative effects are considered.

The last two papers in this issue focus on specific sectors of the economy, notably forestry and agriculture. Walker assesses deforestation processes in developing countries and compares them to historical patterns of deforestation in the developed countries. Smit and Smithers, on the other hand, examine the agriculture sector where the concept of sustainability has been crucial for over at least a century. They review four prominent themes in the field of sustainable agriculture -- ecolfarming, agroecology, food sufficiency and equity -- and assess prospects for sustainable agriculture in Canada.

The eight papers presented in this issue represent the breadth of the literature on sustainable regional development at present. Much of the writing has been anecdotal or policy focused, with only a few empirical analytical studies on which to draw. Better measurement and modelling are required, and the regional science community should be directly involved in the ongoing discussions and studies. It is hoped that this issue will stimulate many of you to redirect your energies to this debate.

References