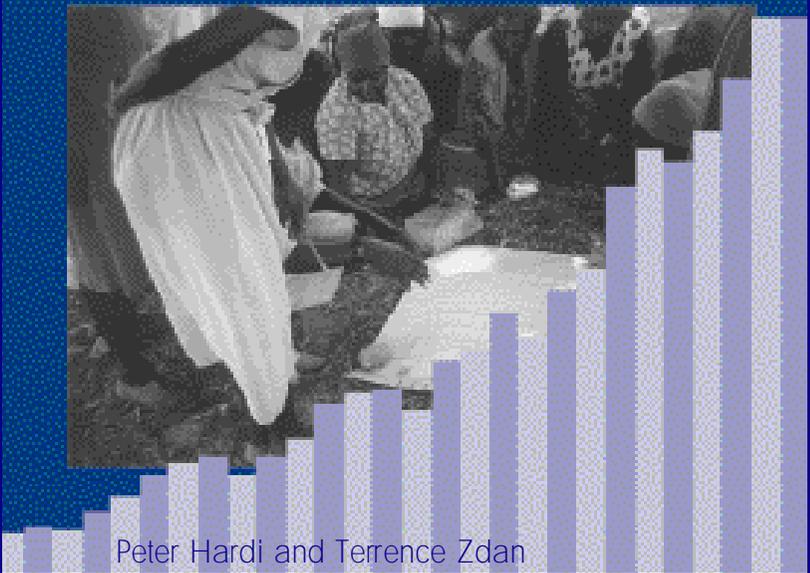


ASSESSING SUSTAINABLE DEVELOPMENT

Principles in Practice



Peter Hardi and Terrence Zdan

IISD

INTERNATIONAL INSTITUTE FOR
SUSTAINABLE DEVELOPMENT

INSTITUT INTERNATIONAL DU
DÉVELOPPEMENT DURABLE

Copyright © The International Institute for Sustainable
Development 1997

All rights reserved

Printed in Canada

Canadian Cataloguing in Publication Data

Main entry under title:
Assessing sustainable development

Includes index.
ISBN 1-895536-07-3

1. Sustainable development - Evaluation.
I. Hardi, Peter. II. Zdan, Terrence John, 1950-
III. International Institute for Sustainable Development.

HD75.6.A88 1997 333.7 C97-920086-5

This publication is printed on recycled paper.

International Institute for Sustainable Development
161 Portage Avenue East - 6th Floor
Winnipeg, Manitoba
R3B 0Y4



Assessing Sustainable Development: Principles in Practice

Editors: Peter Hardi and Terrence Zdan



Acknowledgments

The Bellagio project was undertaken by IISD staff and a group of experts and collaborators. Overall direction came from Peter Hardi, Program Director, Measurement and Indicator Program, IISD. Terrence Zdan was responsible for editorial work and case study coordination. Anthony Hodge, beyond contributing to the volume, provided advice on editing. Nola-Kate Seymoar reviewed the case studies and Julie Wagemakers was responsible for publication. Design and layout was carried out by Don Berg. Valentina Kaltchev coordinated IISD staff and the authors during the Bellagio process. Hernan Fernandez helped with Spanish translation.

Throughout this project the process of researching, writing, clarifying ideas, consulting and editing, lead the people involved to a strong commitment to the case studies. Each contributed to the overall concepts and individual cases. All deserve thanks for their commitment and the quality of their work.

The collection and editing of the case studies, available in print, on diskette and on IISDnet (<http://iisd1.iisd.ca/>), was made possible through the financial support of the Rockefeller Foundation's Innovation Fund.

Table of Contents

The Bellagio Principles for Assessment	1
The Need for Guidelines	7
Introduction	21
Case Studies	
Costa Rica's National Development Strategy for 1994-1998	25
Progress BC: An Assessment of British Columbia's Progress Towards Sustainability	37
The Future of the Global Environment: A Model-based Analysis Supporting the United Nations Environmental Program's First Global Environment Outlook (UNEP GEO-1)	53
Regional Sustainable Development in the Feldbach Region of Austria	67
Sustainable Development Indicators: Monitoring and Assessment at Ontario Hydro	77
The European Pressure Indices Project	93
Community Indicators Resource Pack in the U.K.	105
Sustainable Seattle: The Indicators of Sustainable Community	117
Assessing Progress Toward Sustainability in Developing Countries	129
Eco-auditing and Sustainable Indicators in Norwegian Municipalities	143
Where to From Here?	155
Contributors	159
Index	161

The Bellagio Principles for Assessment

Background

In 1987, the World Commission on Environment and Development (Brundtland Commission) called for the development of new ways to measure and assess progress toward sustainable development. This call has been subsequently echoed in Agenda 21 of the 1992 Earth Summit and through activities that range from local to global in scale. In response, significant efforts to assess performance have been made by corporations, non-government organizations, academics, communities, nations, and international organizations.

Who Developed the Principles?

In November 1996, an international group of measurement practitioners and researchers from five continents came together at the Rockefeller Foundation's Study and Conference Center in Bellagio, Italy to review progress to date and to synthesize insights from practical ongoing efforts. The attached principles resulted and were unanimously endorsed.

What is Their Use and Who are the Users?

These principles serve as guidelines for the whole of the assessment process including the choice and design of indicators, their interpretation and communication of the result. They are interrelated and should be applied as a complete set. They are intended for use in starting and improving assessment activities of community groups, non-government organizations, corporations, national governments, and international institutions.

Overview

These principles deal with four aspects of assessing progress toward sustainable development. Principle 1 deals with the starting point of any assessment - establishing a vision of sustainable development and clear goals that provide a practical definition of that vision in terms that are meaningful for the decision-making unit in question. Principles 2 through 5 deal with the content of any assessment and the need to merge a sense of the overall system with a practical focus on current priority issues. Principles 6 through 8 deal with key issues of the process of assessment, while Principles 9 and 10 deal with the necessity for establishing a continuing capacity for assessment.

1. GUIDING VISION AND GOALS

Assessment of progress toward sustainable development should:

- be guided by a clear vision of sustainable development and goals that define that vision

2. HOLISTIC PERSPECTIVE

Assessment of progress toward sustainable development should:

- include review of the whole system as well as its parts
- consider the well-being of social, ecological, and economic sub-systems, their state as well as the direction and rate of change of that state, of their component parts, and the interaction between parts
- consider both positive and negative consequences of human activity, in a way that reflects the costs and benefits for human and ecological systems, in monetary and non-monetary terms

3. ESSENTIAL ELEMENTS

Assessment of progress toward sustainable development should:

- consider equity and disparity within the current population and between present and future generations, dealing with such concerns as resource use, over-consumption and poverty, human rights, and access to services, as appropriate
- consider the ecological conditions on which life depends
- consider economic development and other, non-market activities that contribute to human/social well-being

4. ADEQUATE SCOPE

Assessment of progress toward sustainable development should:

- adopt a time horizon long enough to capture both human and ecosystem time scales thus responding to needs of future generations as well as those current to short term decision-making
- define the space of study large enough to include not only local but also long distance impacts on people and ecosystems
- build on historic and current conditions to anticipate future conditions - where we want to go, where we could go

5. PRACTICAL FOCUS

Assessment of progress toward sustainable development should be based on:

- an explicit set of categories or an organizing framework that links vision and goals to indicators and assessment criteria
- a limited number of key issues for analysis
- a limited number of indicators or indicator combinations to provide a clearer signal of progress
- standardizing measurement wherever possible to permit comparison
- comparing indicator values to targets, reference values, ranges, thresholds, or direction of trends, as appropriate

6. OPENNESS

Assessment of progress toward sustainable development should:

- make the methods and data that are used accessible to all
- make explicit all judgments, assumptions, and uncertainties in data and interpretations

7. EFFECTIVE COMMUNICATION

Assessment of progress toward sustainable development should:

- be designed to address the needs of the audience and set of users
- draw from indicators and other tools that are stimulating and serve to engage decision-makers
- aim, from the outset, for simplicity in structure and use of clear and plain language

8. BROAD PARTICIPATION

Assessment of progress toward sustainable development should:

- obtain broad representation of key grass-roots, professional, technical and social groups, including youth, women, and indigenous people - to ensure recognition of diverse and changing values
- ensure the participation of decision-makers to secure a firm link to adopted policies and resulting action

9. ONGOING ASSESSMENT

Assessment of progress toward sustainable development should:

- develop a capacity for repeated measurement to determine trends
- be iterative, adaptive, and responsive to change and uncertainty because systems are complex and change frequently
- adjust goals, frameworks, and indicators as new insights are gained
- promote development of collective learning and feedback to decision-making

10. INSTITUTIONAL CAPACITY

Continuity of assessing progress toward sustainable development should be assured by:

- clearly assigning responsibility and providing ongoing support in the decision-making process
- providing institutional capacity for data collection, maintenance, and documentation
- supporting development of local assessment capacity

LIST OF PARTICIPANTS

Alan AtKisson, Redefining Progress, USA

Joe Baker, Commissioner for the Environment, Australia

Jan Bakkes, RIVM, The Netherlands

Chaouki Benazzou, Ministry of Planning, Morocco

David Berry, The White House, USA

Maria Buitenkamp, Friends of the Earth, Netherlands

Candido Cabrido, Department of Environment and Natural Resources, Philippines

Walter Corson, George Washington University, USA

Arthur Dahl, Division of Environment Information & Assessment, UNEP

Gilberto Gallopín, Centro Internacional de Agricultura Tropical, Colombia

Allen Hammond, World Resources Institute, USA

Peter Hardi, International Institute for Sustainable Development, Canada

Tony Hodge, National Round Table on the Environment and the Economy, Canada

Devaki Jain, National Commission for Women, India

Jochen Jesinghaus, Statistical Office of the European Communities, Luxembourg

Anne Kerr, Indicators and Assessment Office, Environment Canada

Tord Kjellström, Office of Global and Integrated Environmental Health, WHO

William Lafferty, Program for Research and Documentation for a Sustainable Society, Norway

Bedrich Moldan, Charles University, Czech Republic

Sabine Müller, Kiel University, Germany

Michael Narodoslawsky, Graz Institute of Technology, Austria

Laszlo Pinter, International Institute for Sustainable Development, Canada

Robert Prescott-Allen, International Development Research Centre/World Conservation Union

Gül Tanghe-Güllüova, Human Development Report Office, UNDP

The Need for Guidelines: The Rationale Underlying the Bellagio Principles for Assessment

R. Anthony Hodge and Peter Hardi

The debate regarding what might be a broadly accepted way of measuring, monitoring, and assessing progress to sustainable development has deep roots. Some suggest that the issue is none other than the age old question “What is the good life?” evoked by the ancient Greeks.

The modern era of assessing progress began in the late 1940s when systems of national accounts and the annual calculation of gross domestic (or national) product (GDP or GNP) were introduced. These measures were designed to allow national governments to track the flow of goods and services in the economy through a calculation of national income. In time, the ease by which the simple numbers could be communicated, their usage in many countries, and the appeal of comparative assessment led to the popularization of GDP/GNP as an indicator of the overall well-being of a given nation.

Over the past half-century, many have spoken out against this practice. In 1987, the World Commission on Environment and Development (the Brundtland Commission) added its voice to the appeal for new ways of measuring progress that would go beyond economic signals and capture a fuller sense of human and ecological well-being. This lay at the heart of the idea of sustainable development and its recognition that a shift in the nature of human activities was required if life for future generations was to be as rich as that found currently. In 1992, The Earth Summit in Rio de Janeiro, Brazil, echoed this same message in Agenda 21.

A full decade has now passed since the Brundtland Commission voiced its call for sustainable development. Today, communities, governments, businesses, international agencies, and non-government organizations are increasingly concerned with establishing a means to monitor performance and to assess progress toward sustainable development. As the new millennium approaches, individuals and organizations take stock of conditions and consider future implications of present activities.

There is a clear link to “results-based management” and associated reporting, whether the scale be a local project, a corporate enterprise, or a large political jurisdiction. Faced with growing demands that expenditures of increas-

ingly limited resources be both well directed and monitored in terms of success, decision-makers are actively pursuing systems for ensuring accountability.

Although many have offered lists of indicators that would supplement the GDP in an overall assessment of progress, consensus has not emerged. Many question whether or not a common list is even possible, given the wide variety of natural conditions and the differences in values apparent from place-to-place.

In response to the need for improved indicators, the International Institute for Sustainable Development (IISD) sought and received support from the Rockefeller Foundation to bring together an international group of measurement practitioners and researchers from five continents to review progress to date and to synthesize insights from practical ongoing efforts. The meeting took place in November, 1996 at the Rockefeller Foundation's Study and Conference Center in Bellagio, Italy.

Rather than debating the choice of ideal indicators of sustainable development, the discussion that ensued was oriented to a more basic level. Overarching principles were sought that would provide a link between theory and practice. This paper provides a summary of the ideas underlying the "Bellagio Principles for Assessment" that ultimately emerged.

Such principles are a pragmatic expression of core values. They serve as practical guidelines for the whole of the assessment process from system design and identification of indicators, through field measurement and compilation, to interpretation and communication of the result. With broad acceptance, it is expected that a common foundation will emerge, even though details of system design and indicator choice might vary greatly in any given application.

The guidelines are interrelated and should be applied as a complete set. They are intended for use in starting and improving assessment activities of community groups, non-government organizations, corporations, national and sub-national governments, and international institutions.

Basic Notions

In general terms, the idea of sustainability is the persistence of certain necessary and desired characteristics of people, their communities and organizations, and the surrounding ecosystem over a very long period of time (indefinitely). Achieving progress toward sustainability thus implies maintaining and preferably improving, both human and ecosystem well-being, not one at the expense of the other. The idea expresses the interdependence between people and the surrounding world.

Development means to expand or realize the potentialities of, bring gradually to a fuller, greater, or better state. It has both qualitative and quantitative characteristics and is to be differentiated from growth which applies to a quantitative increase in physical dimensions.

Sustainable development is not a “fixed state of harmony.” Rather, it is an ongoing process of evolution in which people take actions leading to development that meets their current needs without compromising the ability of future generations to meet their own needs. Conversely, actions that reduce the ability of future generations to meet their own needs should be avoided.

The ideas presented in the above paragraphs are not complicated. They say that certain features of the world need preserving and improvement if life (for people, plants, and animals) is to endure. Further, they reinforce the concept of sustainable development as value-based. Thus the design of a sustainable world — the choice and degree to which “certain features” are to be sustained — will depend on the operating set of values, values which will shift over time and will vary within communities and from place to place.

Achieving progress toward sustainable development is clearly a matter of social choice, choice on the part of individuals and families, of communities, of the many organizations of civil society, and of government. Because it involves choice, change is only possible with the broad involvement of the general public and decision-makers in government and across civil society. And because of the need for this involvement, care must continually be taken to ensure that substantive conceptual and technical issues are considered within the context of the delicate value-driven processes of real, day-to-day decision-making. In this way, new insights can effectively be fed to decision-makers and conversely, the processes of assessment and decision-making can enhance technical and public inquiry. The process is a two-way street.

In summary, sustainable development commits us to considering the long-term and to recognizing our place within the ecosystem. It encourages a continuing reflection on the implications of human activity. It provides a new perspective from which to see the world. It is a perspective that forces the bridging of many ideas and disciplines (contemporary and traditional) that have previously remained disparate. Those using this perspective, including the Brundtland Commission and participants at the Earth Summit among many others, have come to the conclusion that the current nature of human activity is inadequate for meeting current needs and is seriously undermining opportunities for future generations.

The Bellagio Principles for Assessment serve to focus the perspective described above. They are offered in the belief that seeing differently is the first step to doing differently.

Current Approaches to Assessing Progress toward Sustainable Development

A number of approaches to assessing progress toward sustainable development are currently being developed and tested. In most cases, the emphasis is on choosing appropriate measures for the task and in organizing them in a meaningful way. A dominant concern is to effectively communicate the result to the general public, as well as to decision-makers in civil society and in government.

The organizing frameworks that emerge are inevitably hierarchical — extending from broad categories of data and information to detailed measures. Developing and using a clear conceptual framework for guiding the assessment process is very important. With a conceptual framework in place, indicators emerge more naturally, and can be adjusted to the needs of a given locale or set of decision-makers.

An effective framework accomplishes two important goals: first, it helps determine priorities in the choice of indicators; and second, it triggers the identification of indicators which may be more important in the future. Knowing what is not being emphasized is as important as knowing what is. In an analogous way, a lack of data for some indicators can be an important signal in itself. In this way, the effective framework serves as a check template to be revisited from time-to-time in a test of current priorities. This reflection cultivates an anticipatory capacity.

Any framework that is chosen reflects some sort of conceptual model against which the real world can be set. Five groups of models appear to be emerging as influential in assessing progress toward sustainable development. These include: (1) models with roots in economics; (2) stress and stress-response models; (3) multiple capital models; (4) various forms of the three-part or theme “social, economic, environment” model; and (5) the linked human-ecosystem well-being model. The first two of these are considered partial system models. The latter three are full system models that try to capture all aspects of the system, including people and the environment.

The frameworks, the categories of data and information that are included, and the choice of specific measures, all reflect the values, biases, interests, and insights of their designers. Sometimes these are explicit in the form

of sets of principles that guide the application of a given framework and set of indicators, sometimes they are not expressed at all. In addition, value-driven principles are often developed as part of strategic planning exercises linked to such interests as sustainable communities, healthy communities, sustainable or environmentally sustainable economic development, human centered development, corporate sustainability, and so forth.

The various initiatives and interests noted above represent a tremendous pool of experience and insight from which to draw. In this work, an attempt has been made to use this base of understanding to inform deliberations in such a way that common ground is identified.

The Bellagio Principles for Assessment

Any assessment of change needs a frame of reference to identify if change has taken place and to set a context for judging whether that change is good or bad. While it is not necessary to know an exact end point, an essential condition for assessment is to establish a desirable direction for change. For example, moving towards fewer people in a state of poverty and starvation, a lower level of infant mortality, more supplies of clean and abundant water, improved air quality, less discharge of toxic contaminants to the environment, less soil erosion, fewer fisheries in crises, etc. all signal directions that would be consistent with progress toward sustainable development. All of these changes, provided that they are enduring, indicate an improvement in human and ecosystem well-being.

In any given community and ecosystem, it is essential to articulate a vision for the future. This step reflects the values of the community or region, and therefore must build from a process that includes the spectrum of different constituent groups. Goals can then be articulated that formally express the trends and provide the basis for the entire assessment, including the selection of indicators. The vision and goals together provide the starting point of any assessment.

Principle 1: Guiding Vision and Goals

Assessment of progress toward sustainable development should:

- be guided by a clear vision of sustainable development and goals that define that vision

The concept of sustainable development links people with the surrounding world. Assessing progress toward sustainable development thus implies

that information must be gathered about people, and about the surrounding world. Such an approach is closely linked to ideas that have emerged within systems theory.

A core element of that approach is the idea of the “whole” system which can co-evolve successfully in a changing environment. Such systems are characterized by: (1) emergent properties which are critical for understanding the whole but may have little or no meaning in terms of constituent parts; (2) a hierarchical structure in which systems are nested within other systems; and (3) processes of communication, feedback, and control that allow adjustment and adaptation in the face of stress.

Conceptual models are used to link components to the “whole” and identify controls and feedback loops. In order to assess the state or performance of the constituent parts, controls, feedback loops, and the whole system, indicators or performance measures are needed.

The power of a whole system approach derives from a realization that some system properties are not evident from simply looking independently at the parts. Most importantly, the overall well-being of a system cannot be tested by independent analysis of the parts. And similarly, taking action to adjust the system can only be effective if the integrated set of factors influencing the system (such as stress imposed on the ecosystem by human activity) is considered.

These ideas serve to set very broad boundaries for defining the content of what should be included in assessing progress toward sustainable development. For example, environmental concerns have historically focused on pollution and generation of chemical stress (the emissions and discharges) that lie at its root. Physical and biological stresses (for example, habitat destruction, introduction of exotic species) have received less attention. Similarly, groundwater concerns have often received little attention compared to air quality and surface water concerns. And plant and insect life rarely figure in environmental assessments while the more visible birds and large mammals (often those subject to hunting) do. From a systems or holistic perspective, these emphases make little sense.

Obviously, there are many cause/effect relationships we are only beginning to recognize and understand. The only hope for gaining cause/effect insight is to chip away at understanding the different system components and their relationships, both to each other and to the whole. In turn, this observation underlines the need to assume a learning and reflective stance. A given interpretation of an indicator set or a particular system assessment should be considered as part of a learning exercise, never an end in itself. New data and information leading to a new interpretation

of state and trends does not imply that the former interpretation was wrong but rather that society has learned its way to a more complete insight.

Maintaining a perspective on the “whole” system also facilitates development of a capacity to “anticipate and prevent” rather than having to retrospectively “react and cure.” It is by looking at characteristics of the whole system that early warning signals can be identified so that action to prevent crises can be taken.

Principle 2: Holistic Perspective

Assessment of progress toward sustainability should:

- include review of the whole system as well as its parts
- consider the well-being of social, ecological, and economic sub-systems, their state as well as the direction and rate of change of that state, of their constituent parts, and the interaction between parts
- consider both positive and negative consequences of human and ecological systems, in monetary and non-monetary terms

Several important aspects of assessment fall from taking a holistic perspective. It demands a consideration of people and the surrounding ecosystem and both positive and negative implications of human activity. In assessing human activity in this manner, the full life cycle needs consideration along with the full costs borne not only by people but also by ecosystems. This is a major challenge because many of the factors that require consideration are not amenable to measurement in economic terms. Thus, both monetary and non-monetary forms of valuation must be used.

Further, the distribution of costs and benefits is often as important as their absolute magnitude. For example, total wealth generated can be very great and figures describing wealth generated per capita can appear very strong. However, if the costs of generating benefits are borne by others, the system is unjust and unstable. From an assessment perspective, such a review of equity and disparity implies that data and information are generated that allow comparisons to be made among sub-populations. For example, comparisons might be based on gender, age, ethnicity, socio-economic status, health status, or living location (such as urban or rural).

Principle 3: Essential Elements

Assessment of progress toward sustainable development should:

- consider equity and disparity within the current population and between present and future generations, dealing with such concerns as resource use, over-consumption and poverty, human rights, and access to services, as appropriate
- consider the ecological conditions on which life depends
- consider economic development and other, non-market activities that contribute to human/social well-being.

Taking a holistic perspective also means adopting a time horizon that spans both human and ecosystem time scales. The human-ecosystem time discrepancy is one of the most significant challenges to be overcome in bringing the ideas of sustainable development from theory to practice in contemporary decision-making. Use of ecosystem-based time horizons that extend decades, centuries and beyond, push economic analyses and current systems of law beyond their present capacity.

However, a central theme of sustainable development is care for future as well as present generations and care for ecosystems as well as for people. Application does not mean that a vast data set is required. Comprehensive economic, societal, and health data sets, however, only extend back about 40 years in the most developed countries; for environmental data it extends to about half that. Thus a long-term, multigenerational time horizon is needed. It means that long-term (decades to centuries) implications are considered and anticipated. Techniques for intergenerational assessment need to be developed. As data sets grow through the next century, a greater degree of assurance may evolve.

As with the time dimension, sustainable development demands a shift in spatial perspective. The nature of human activities are now such that activities undertaken at one location can have implications for people and ecosystems located far away. This is particularly the case because of:

- international trade activities that rapidly shift costs and benefits from one part of the world to another;
- international aid activities that work to ameliorate conditions in one part of the world by shifting benefits from another;
- emissions of contaminants to air that have a capacity for long-range transport or that in fact alter the nature of the outer atmosphere to cause global-scale change;

- discharge of contaminants and debris to the marine environment with a capacity for long-range transport;
- generation of environmental stress (for example through habitat destruction, introduction of exotic species, and pollution) that affects ecosystem, species, or genetic diversity with global implications.

In order that full costs be accounted for and implications integrated into decision-making, the physical boundary for a given project area or of a target jurisdiction should be set to include the full extent of affected ecosystems.

Principle 4: Adequate Scope

Assessment of progress toward sustainable development should:

- adopt a time horizon that spans both human and ecosystem time scales to ensure that the needs of future generations are addressed while responding to current short-term decision-making requirements
- define the space of study large enough to include not only local but also long distance impacts on people and ecosystems
- build on historic and current conditions to anticipate future conditions — where we want to go, where we could go

Taking adequate scope to the extreme would imply development of an assessment that is beyond the possibility of implementation. The intent of this principle is to broaden the perspective, and keeping the analysis manageable. Technically, it is not possible to compile everything about everything, and decisions can not wait for decades of further research. Rather, a conceptual approach must be taken that recognizes the limits to current understanding. In order to improve the assessment process, the following has to be clearly seen:

- the cause/effect linkages between human activity, the generation of benefits to and stresses on people and the ecosystem, and the resulting human and ecological conditions should be better understood;
- more effort is needed to ensuring a degree of transparency in assessing conditions and the changes that are evident. As a result, the capacity to learn from past mistakes and transmit that learning forward would be enhanced;
- both the strength of measurement techniques and the availability of data need to be made more even across the system;

- even when data are available, a comparative mechanism such as an established target or threshold, to enable assessment should be more readily available;
- even when point-in-time data are available, time series, which are adequate to generate well-based trend analyses, are more frequently needed;
- more adequate analytic techniques (physical and numerical) should be applied, particularly when dealing with the integrated effects of multiple factors and in considering future conditions;
- a more interdisciplinary approach and an integrated perspective are necessary to bridge the gap among disciplines.

There are very real limits to human, financial, and time resources: we do not have the luxury of stopping and waiting until full understanding exists. In short, focus is inevitable and needed.

Principle 5: Practical Focus

Assessment of progress toward sustainable development should be based on:

- an explicit set of categories or an organizing framework that links vision and goals to indicators and assessment criteria
- a limited number of key issues for analysis
- a limited number of indicators or indicator combinations to provide a clear signal of progress
- standardizing measurement wherever possible to permit comparisons
- comparing indicator values to targets, reference values, ranges, thresholds, or directions of trends, as appropriate

A number of factors underlie a need for special treatment of the processes that are undertaken in completion of an assessment of progress toward sustainable development. These include:

- the magnitude of the issues being faced and the resulting need to engage a broad spectrum of society in identifying problems and designing and implementing related solutions;
- the value-based nature of the concepts of sustainable development and sustainability and the need to recognize the diverse and changing nature of values held across society;

- the limits to our understanding of the system that requires consideration and the need to bring as many disciplinary perspectives to bear as possible;
- the importance of effectively linking to the needs of decision-makers;
- the need to maximize learning opportunities.

As a result, it is essential that processes of assessment are open and broadly accessible. To generate the credibility needed to contribute to decision-makers as well as maximize learning opportunities now and in the future, assessments must describe the rationale for judgments, identify the assumptions that are made and the uncertainties that arise. Uncertainty may be the most significant factor undermining good decision-making or the spark to creative surprise. It is an inevitable part of decision-making and should be an explicit consideration in interpreting data and information and in communicating the results.

Principle 6: Openness

Assessment of progress toward sustainable development should:

- make the methods and data that are used accessible to all
- make explicit all judgments, assumptions, and uncertainties in data and interpretations

Communication is central to any assessment process. The issues are complex, the words are not precise (for example in English, the words environment, criteria, and social are used differently by different disciplines), and the entire process is normative. If these concerns are to be minimized, and work is to stand peer and public scrutiny, and the results are to effect decision-making, the assessment process and indicator design must be transparent, fully documented and clearly communicated.

To engage a broad spectrum of society and feed insights to the public and decision-makers, the assessment as well as the process used in its development must be built around effective communication. This implies that the structure and expression of ideas is simple in form.

Cultural differences also exist within any society: different groups of decision-makers can be differently characterized in terms of values, motivation, and needs for supporting data and information. Thus corporate culture can be differentiated from bureaucratic culture which in turn is different from the culture of academics and so forth. The culture of decision-making of families is different again than all of the above. And yet each of these sub-cultures has an important role to play in achieving progress toward

sustainable development. An effectively designed system with nested indicators will be sensitive to the differences for two reasons: (1) to minimize costs by identifying common needs; and (2) to ensure results that can contribute to decision-making.

Principle 7: Effective Communication

Assessment of progress toward sustainable development should:

- be designed to address the needs of the audience and set of users
- draw from indicators and other tools that are stimulating and serve to engage decision-makers
- aim, from the outset, for simplicity of structure and use of clear and plain language

The need for broad participation in assessment processes, in particular by decision-makers themselves, requires emphasis. Without such participation and the identification of concerns, design and implementation of solutions becomes more difficult. Given the scale and complexity of some of the issues, resolution is beyond the capacity of a single sector.

Further, without broad participation, it is impossible to reflect the diverse and changing nature of values held across society, and chosen courses of action will respond to the short term needs of a particular interest group rather than being founded in the aspirations of a cross-section of society. The inevitable result is short-term responses that preclude long-term human and ecological needs that are central to sustainable development.

The need to involve all key stakeholders in decision-making is fundamental to sustainable development. It is driven by the realization that the range of stakeholders must assume responsibility for and participate in resolution of the many human and ecological problems now before us. Involving them in decision-making processes governing conditions that affect them, they will be more likely to assume responsibility and act.

This requirement opens the door to sensitive cultural issues because the nature of participation in decision-making varies between cultures and political jurisdictions. The intent of this principle, however, is to increase the transparency of decision-making, not to judge as right or wrong different decision-making cultures.

The assessment process merges “values expertise” with “technical expertise” through a broadly participatory reflective process that can address and take creative advantage of the inevitable tensions. A linked, “bottom-up, top-down” assessment process is therefore essential to ensure that a

range of values receive fair consideration; that participants recognize the role that they play in creation of the problem in the first place; and to facilitate early ownership of problem solutions that emerge.

Principle 8. Broad Participation

Assessment of progress toward sustainable development should:

- obtain broad representation of key grass-roots, professional, technical, and social groups, including youth, women, and indigenous people — to ensure recognition of diverse and changing values
- ensure the participation of decision-makers to secure a firm link to adopted policies and resulting action

Developing a Continuing Capacity for Assessing Progress

Undertaking a single assessment of conditions is better than none at all, but should be considered only a small step in a continuing learning process. Trends identified in an initial assessment and the conclusions that result require testing over time to develop confidence and ensure credibility. Furthermore, it is only through such continual assessment that the success of corrective measures taken by business, government and across civil society can be evaluated and modified as appropriate.

Thus, the need for continuity is two-fold. First, there is a strategic need for monitoring the success of actions taken over time and results-oriented management.

Second, there is a substantive need to enhance our knowledge base. Human society exists as part of a dynamic system, much of which is ill-understood. Assessing progress toward sustainable development must deal with that system in a high degree of uncertainty. Continual assessment reveals new insights and identifies other unknowns to be explained.

Principle 9: Ongoing Assessment

Assessment of progress toward sustainable development should:

- develop a capacity for repeated measurement to determine trends
- be iterative, adaptive, and responsive to change and uncertainty because systems are complex and change frequently

- adjust goals, frameworks, and indicators as new insights are gained
- promote development of collective learning and feedback to decision-makers

To be established and cultivated over time, the assessment capacity described above requires some degree of continuing resources. Data and information must be collected over time, synthesized, and communicated. Resources must be committed and effort made to support the development of local capacity to participate throughout the assessment process. Thus, an institutional home must be found and supported on a continual basis. Without that support, a capacity for assessment will not evolve.

Perhaps, the best means to ensure adequate capacity for assessment is adopting a commitment to sustainable development that institutionalizes assessment and reporting on progress. The approach is similar to that taken for existing financial reporting. Such actions ensure that the necessary resources are allocated to make assessment an ongoing activity. A business may adopt a corporate policy and develop a strategic plan to achieve targets and goals. A community may implement a variety of regulations and incentives to undertake assessments.

The ability to undertake assessment requires a commitment of resources. The Bellagio Principles for Assessment recognize and address the need for restructuring organizations, changing roles and responsibilities, creating information management systems, auditing, reporting and communication strategies and other activities, including professional development and training, that create the internal support for conducting assessments.

Principle 10: Institutional Capacity

Assessment of progress toward sustainable development should be assured by:

- clearly assigning responsibility and providing ongoing support in the decision-making process
- providing institutional capacity for data collection, maintenance, and documentation
- supporting development of local assessment capacity

Introduction

The Bellagio Principles for Assessment are guidelines for undertaking and improving assessments of progress toward sustainable development. These principles are helpful in selecting indicators, measuring progress, interpreting and communicating assessment results. They are intended for use in determining starting points, specifying content, and suggesting scope. As a set they help build the capacity for doing assessments. The first chapter of the volume gives the rationale and practical guidelines offered by the principles.

The Bellagio Principles for Assessment offer advice about how to do things right. But there is no one right way to do an assessment. The case studies collected from around the world emphasize site-specific issues and unique approaches. They demonstrate the diversity in sustainable development assessments. Each case tells an interesting story in its own way. A serious attempt was made to include examples from developing countries, as well as from the private sector, although the majority of cases chosen deal with the public sector in developed countries.

The case studies cover a wide range. Case study #1 presents a country's vision for sustainable development in Costa Rica. It shows how a national vision and strategy can be realized through the establishment and restructuring of institutions, implementing a series of aligned plans, and putting in place a mechanism for monitoring and measuring progress toward sustainable development.

Case study #2 describes assessment work in the sub-national context of the Canadian province, British Columbia. Here a comprehensive holistic approach, linking ecosystem well-being to human well-being, has been applied, combined with new methods for measuring qualitative indicators, and a novel aggregation technique.

Case study #3 gives an overview of the method used to test the impact of policy scenarios in the context of global environmental issues. It outlines the contribution of the Dutch National Institute of Public Health and the Environment to the Global Environment Outlook Project of the United Nations Environment Programme (UNEP). It assesses future outcomes by examining essential elements including the potential of technology transfer and changes in consumer behavior.

Case study #4 demonstrates the importance of temporal and spatial scales in an assessment of a regional agrarian economy in Austria. In this study the ecological footprint concept was used to link human activities to environmental impacts.

Case study #5 describes how the corporate sustainable development framework of Ontario Hydro, one of the world's largest utility companies, is focused on the implementation. Assessment in this private sector setting is accomplished through a nesting of indicators, strategic planning, and reporting key results. Selected composite indicators monitor the company's resource use efficiencies and environmental performance.

Case study #6 gives an account of international collaboration in undertaking the European Pressure Indices Project, led by EuroStat, the statistical agency of the European Union. Openness in methodological presumptions, transparency of the assessment process and the use of survey instruments are demonstrated to be efficient ways for obtaining consensus and prioritizing indicators among large numbers of participants.

Case study #7 highlights the role of effective communication in disseminating the findings of assessments and influencing local management in several communities of the United Kingdom. It describes how a self-help guide is being prepared for communities to develop and communicate important indicators.

Case study #8 documents a project to measure progress toward sustainable development based on broad public participation in the city of Seattle. The coalition *Sustainable Seattle* identified the most important indicators, processed data and published assessments. This American experience serves as a hallmark example of what volunteer citizens can accomplish.

Case study #9 summarizes the experiences of international assessments of sustainable development strategies that have taken place in local communities of South America, Africa and India, through the initiative of the International Union for the Conservation of Nature (IUCN) and the International Development Research Centre (IDRC). The "*Egg of Sustainability*" and a variety of techniques are described in the context of conducting ongoing assessments.

Case study #10 presents the experience of Norwegian municipalities responding to legislated requirements to assist in meeting the objectives of Agenda 21. Municipalities are adopting environmental auditing and other analytical tools to improve their capacity to assess progress toward sustainable development. Though it describes techniques already known

from environmental policy making, it proves that existing methods can well be adjusted and used in the context of sustainable development.

Our focus in this book is on pragmatic assessment. Instead of elaborate theoretical discussion about why a principle is important the case studies give practical examples demonstrating how the principles can be put into practice. Each case study contributes to the process and content of sustainable development assessments.

Over time the success of the case studies will be measured by:

- the degree to which they inspire new assessments using currently available methods;
- the extent to which they lead to modifying, inventing and testing new assessment methods;
- the increases in the capacity for assessment; and,
- the reduction of fears about the difficulty of assessments.

The Bellagio Principles for Assessment and the case studies encourage concrete action to achieve sustainable development and implement Agenda 21.

July 1997

Peter Hardi and Terrence Zdan

Assessment Principle #1: Vision and Goals

Assessment of progress toward sustainable development should be guided by a clear vision of sustainable development and goals that define that vision.

Costa Rica's National Development Strategy for 1994 - 1998

Adrian Rodriguez

Summary: Costa Rica's *National Development Strategy* incorporates sustainability criteria in national development planning. The immediate response to the strategy has been the reform and creation of Costa Rica's institutional framework for sustainable development.

Costa Rica's historical leadership in social reforms, addressing education, poverty and health care, and environmental protection, made adopting strategic plans for sustainable development a logical progression. An overview of the strategy's components, and a description of institutional arrangements facilitating Costa Rica's approach to achieving its national vision and goals for sustainable development are given.

Implementing Costa Rica's national strategy flows from the institutional framework and is being accomplished through a nesting of aligned policies and programs in social, economic, institutional and environmental sectors. Assessing progress is proceeding as a sensible consequence of the vision-based organizational framework. Costa Rica's System of Indicators of Sustainable Development, SIDES, a data base of indicators used for assessment, is currently available on a web site.

For more information contact:

Dr. Leonardo Garnier,
Minister of National Planning and Economic Policy, Costa Rica,
Call 4, No. 350, Edificio Alfa
PO Box 10127-1000
San Jose, Costa Rica
Tel: (506) 221-9524
Fax: (506) 221-3282
e-mail: lgarnier@ns.mideplan.go.cr; sinades@ns.mideplan.go.cr
<http://www.mideplan.go.cr>

Introduction

Costa Rica's National Development Strategy for 1994-1998 is guided by the concept of sustainable development, following the principles of Agenda 21. This strategy is based on the government's election campaign platform that revolved around the concept of sustainable development. The strategy was officially announced by President Figueres and members of his Cabinet on May 9, 1994, the day after the inauguration of his government.

The strategy aspires to position Costa Rica on a path for sustainable development through two fundamental principles. First equitable improvements in the quality of life of the population. And second, that such quality of life improvements be permanent and integral in economic, social, environmental and institutional terms. This was stressed by President Figueres in his May 9th, 1994 address when he indicated that "...our vision of sustainable development is achieving the largest general welfare in the present while taking care of the equilibrium that makes possible our development over the long run in its economic, social and environmental dimensions".¹

Accordingly, the strategy establishes four objectives directed at social, economic, environmental, and institutional aspects of sustainability. Social sustainability will be enhanced by strengthening social policy at the core of government actions. Economic sustainability will promote a competitive productive structure based on the efficiency and productivity of physical, natural and human resources. Environmental sustainability will be based on building an alliance with nature which balances the demands of social and economic development on natural resources and the environment. And institutional sustainability will promote mechanisms for responsible participation of civil society actors in decision-making processes.

In short, the strategy stresses the need for social investment; economic growth and competitiveness; environmental equilibrium, restructuring institutions and public participation.

Two years after inauguration, in his State of the Nation Report to the Congress on May 1st 1996, President Figueres stressed this strategy, indicating that "In our pursuit of sustainable development, our program focuses on crucial areas. I refer to taking care of the equilibrium on which the stability and dynamism of our economy depends; to forming an alliance with nature which allows us to make better use of our natural resources and preserve them for generations to come; to improving social

investment to expand welfare opportunities to all; and to strengthening the capacity of the Government to guide society toward new confines”.²

The National Development Strategy demonstrates the Costa Rican Government’s intention of leading the Costa Rican society on a path of sustainable development and equity. The implementation of the strategy is being co-ordinated by the Ministry of National Planning and Economic Policy (MIDEPLAN).

The Context of the Strategy

The National Development Strategy is built on Costa Rica’s long standing tradition of progressive social, economic and environmental reform. Costa Rica leads Latin America in human development with achievements over the last 50 years in a national health care system, universalized social security, plans for low cost housing, programs to fight poverty, strengthening higher education, and creation of national parks, protected areas, and environmental legislation.

Another demonstration of Costa Rica’s commitment to sustainable development is its initial role in testing the indicators of Sustainable Development recommended for reporting by the UN Department for Policy Coordination and Sustainable Development. Indicators such as a life expectancy at birth of 76 years, an infant mortality rate of 13.6 per thousand, a literacy rate of 95 per cent, access to drinking water inside the house by 92 per cent of the population and access to sewage systems by 97 per cent — show Costa Rica’s comparative success.

The incorporation of the concept of sustainable development in public policy design was attempted before the Rio Summit took place. The *Conservation Strategy for Sustainable Development* (ECODES) was promoted by the Ministry of Natural Resources, Energy, and Mines (now the Ministry of Environment and Energy) during the late 1980s. ECODES was a comprehensive and ambitious attempt to develop a framework for the definition of development policies compatible with the protection of the natural resource and environmental base, building upon the concept of sustainable development that emerged from the 1987 Brundtland Report.

Main Components of the Strategy

The *1994-1998 National Development Strategy* is defined in a *National Development Plan* which addresses Costa Rica’s vision for sustainable

development by setting goals for social, economic, environmental, and institutional reform. This vision has also been incorporated into several sectoral policy plans currently under implementation.

From a social perspective the goal is to strengthen social policy at the core of government actions, highlighting the importance of policies that promote social mobility. The policy emphasizes education, public health, housing and poverty alleviation programs targeted to children, youth, women and the disabled.

From an economic perspective the goal is to promote a competitive economy based on the efficiency and productivity of physical, natural and human resources, integrated in the global market. Policies promote economic stability, efficiency and productivity; resource management; and support economic democratization.

From an environmental perspective the goal is to build an alliance with nature which balances the demands of social and economic development on natural resources and the environment. Sustainable management and use of natural resources, the prevention and control of pollution and environmental degradation, and promoting attitudinal changes toward environmental problems are being addressed.

From an institutional perspective the goal is to promote mechanisms for responsible public participation in decision making processes. Public institutions are restructuring to become more accountable, achieve efficiency and equity in the provision of public services; include public participation in decision making processes; and become more sensitive and responsive to public needs.

Several policy action plans designed in the context of the National Development Strategy are oriented to promote Sustainable Development. These action plans are consistent with the policy proposals from the 1992 Earth Summit and the successive World Conferences on Population and Development, Women, and Social Development. All these policy proposals are at different stages of implementation.

Environmental policy: The Ministries of National Planning and Environment elaborated a National Environmental Policy Plan. This plan is consistent with Agenda 21 Chapter 8 about the integration of environment and development in decision making. It defines as priorities the protection, conservation and sustainable management of natural resources; air pollution in the Metropolitan Area of San José; water pollution; solid waste management; and the use and management of pesticides.

Poverty alleviation: A National Poverty Alleviation Plan was elaborated, which focuses on five areas: i) infancy and youth; ii) women; iii) job creation; iv) solidarity with the disabled; and v) community development.

Women issues: The Plan for Equality of Opportunities between Men and Women is intended to improve participation of women in policy formulation and decision making processes related to the sustainable use of natural resources and protection of the environment.

Education: Strategies for the transformation of the Costa Rican education system to attain standards of international quality, and ensure the sustainability of human resources and economic, social and environmental sustainability are being developed and implemented. This initiative has been supported by a Law Proposal presented to the Congress, “*Ley de Fundamentos y Garantías para el Desarrollo y Mejoramiento Continuo del Sistema Educativo Nacional*”. (*Law of Fundamentals and Guaranties for the Development and Continuous Improvement of the National Education System*).

Public health: The Government initiated the implementation of a public health program called *Basic Teams for Integral Attention of Health*. It is intended to improve coverage, accessibility, quality and efficiency in the provision of public health services, with emphasis on preventative care.

Economic policy: The economic dimension of sustainability is partially addressed through initiatives to eliminate subsidies unfriendly to the environment; and improving economic equity and distribution such as implementing laws to prosecute tax evasion, and creating a state funded pension system. Also, new legal and economic instruments are being developed to support environmental policy. The recently-approved *Forest Law* introduces the concept of “environmental services,” meaning services provided by forests and forest plantations which impact directly on protection and improvement of the environment. This law also creates the *Forest Protection Certificate* (CPB), which remunerates owners of natural forests for the environmental services these provide. This is quite significant in terms of both environmental and economic policy: Costa Rican legislation explicitly recognizes that forests provide many goods and services in addition to wood and agricultural land, and that these goods and services must be assessed appropriately even though there may

not be a market for many of them. Carbon taxes (taxes on fossil fuels) will be used to promote reforestation activities that contribute to fixing gases that cause greenhouse effects.

Intended Audience

The 1994-1998 National Development Plan identifies priorities within a vision oriented by the concept of sustainable development. Its purpose is to guide policy and government actions according to those priorities. Its intended audiences are Government institutions, as well as non-government stakeholders and the general population.

Accomplishing the Vision and Goals

Costa Rica's vision and goals for sustainable development are instrumental in guiding policy formulation and implementation. The policy development process generated a new structure of integrated institutions that mobilize participation in public, business, academic and government sectors. These in turn provide ongoing feedback throughout implementation. The government also established a National System for Sustainable Development (SINADES) and a System of Sustainable Development Indicators (SIDES).

The National System for Sustainable Development (SINADES) is under the direction of MIDEPLAN. SINADES co-ordinates public sector actions, strategies and policies to promote sustainable development. SINADES consists of an Executive Secretariat, Technical Advisory Commissions and Institutional Sustainable Development Units. The secretariat, assisted by MIDEPLAN, provides advice and support on operational matters and co-ordinates activities between participating groups. The technical commissions provide support and advice on Costa Rica's most important sustainable development issues such as biodiversity and climate change. For example, within SINADES the Advisory Commission on Biodiversity (COABIO) is responsible for Costa Rica's involvement with the Biodiversity Convention and related articles contained in Agenda 21. The institutional sustainable development units (UNIDESOs) are working groups on sustainable development within public sector agencies. They co-ordinate and assist formulation of sustainable development principles within the culture and day to day functions of their organizations.

The System of Indicators of Sustainable Development (SIDES) was established to generate and improve access to information that can be

used to assess progress toward sustainable development goals. SIDES accomplishes this through making relevant information on sustainable development available to the public. It can be accessed through the Internet (<http://www.mideplan.go.cr>). SIDES provides a forum for users and providers to exchange information, and the data serves as the basis for aggregated sustainable development indicators.

The operation of SIDES is supported by a National Commission on Information for Sustainable Development (INFODES), a co-ordinating mechanism for initiatives related to the production and use of sustainable development information, created by an Executive Decree. This commission includes representatives from the government (the ministries of Planning, Environment, Health, Education, The General Director of Statistics and Census, and the Central Bank of Costa Rica), the academic sector, the business community; and, non-government organizations. INFODES is the National Coordination Mechanism for the implementation of Indicators of Sustainable Development within the testing program of the UN-DPCSD.

The objectives of INFODES include: (i) to co-ordinate and promote the production and use of information on sustainable development; (ii) to promote the establishment of co-ordination mechanisms between producers and users of information on sustainable development; and (iii) to promote and ensure access to information by all sectors of society. INFODES has begun to assess indicators used in Costa Rica. It is also identifying and selecting which indicators best suit priorities.

External to the government an institutional structure was developed to encompass sector specific and mixed interest group bodies. The sectors include: (i) the National Commission of Non-Governmental and Social Organizations for Sustainable Development (CONAO), which has a regional organizing structure; (ii) a Commission and Technical Unit for Sustainable Development operating inside the Union of Chambers and Associations of Private Enterprises (UCCAEP); (iii) several commissions on sustainable development, environmental education, forests, and biodiversity, within the National Council of University Presidents (CONARE) and (iv) the National Indigenous Board, an organization which brings indigenous groups together to generate policy proposals and implement sustainable development actions for indigenous peoples in Costa Rica.

A number of initiatives have been generated within the academic segment, such as:

- consolidation of the International Center for Economic Policy on

Sustainable Development (CINPE) and its Master's-level program in Economic Policy and Sustainable Development; at the National University (UNA)

- creation of the Center for Research in Environmental Protection (CIPA), which includes the Research Program on Ecologically Sustainable Human Settlements, and of the Research Center for Forestry-Industry Integration; Costa Rican Institute of Technology (ITCR)
- creation of the Center for Research in Sustainable Development (CIEDES); and the Program on Sustainable Urban Development (PRODus) at the University of Costa Rica (UCR)

Business sector participation in activities promoting sustainable development is increasing. This is reflected in the development of institutional structures within the Costa Rican Union of Chambers and Associations for Private Enterprise (UCCAEP), the business sector's highest directive body (uniting more than 30 business chambers). UCCAEP established a Commission and Technical Unit on Sustainable Development whose objective is to co-ordinate and promote implementation of sustainable development actions within the different productive sectors.

Mixed interest group structures consist of the National Council on Sustainable Development (CONADES), and the Foundation for Cooperation on Sustainable Development (FUNDECOOPERACION).

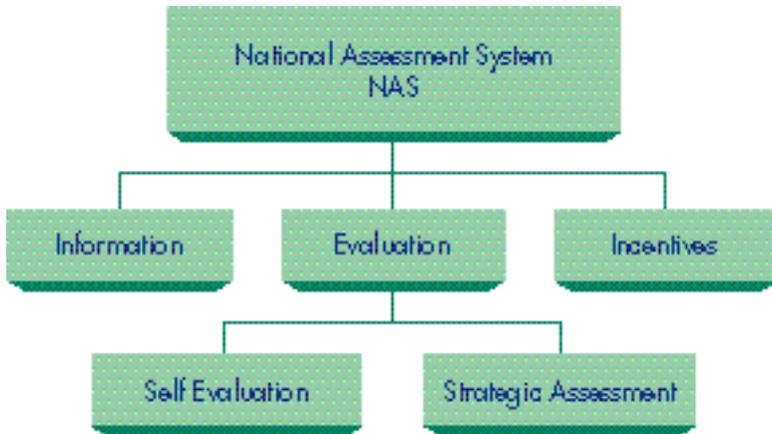
CONADES is an advisory body that promotes dialogue and consensus-building on sustainable development, and consists of representatives from the government and major groups identified in Agenda 21.

FUNDECOOPERACION is a Foundation whose role involves execution and administration of funds, programs, and projects to implement and promote sustainable development in Costa Rica.

Assessment

The National Assessment System (NAS) promotes a culture of planning and assessment within Costa Rica's government institutions. Figure 1 provides an outline of the system. Information refers to different levels of detail required by different stakeholders in the assessment process. Evaluation may be either operational or strategic, and incentives reflect encouragement for institutions to adopt a culture for assessment.

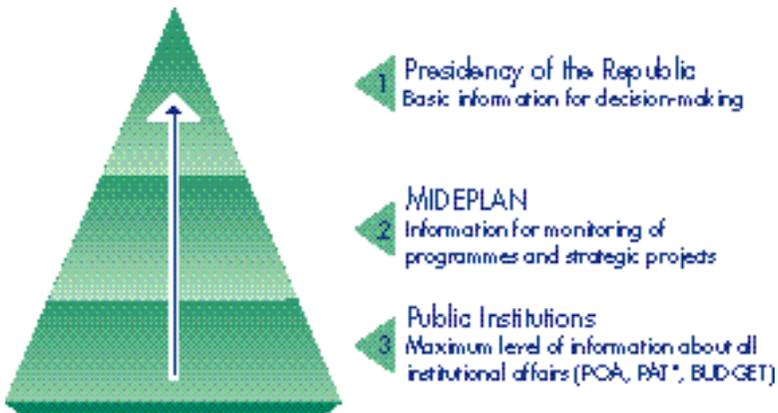
Figure 1: National Assessment System



Source: <http://www.mideplan.go.cr>

Vital information used for assessments is exchanged in a “top-down and bottom-up process” illustrated in Figure 2. Three levels of information are delineated according to decision-making needs.

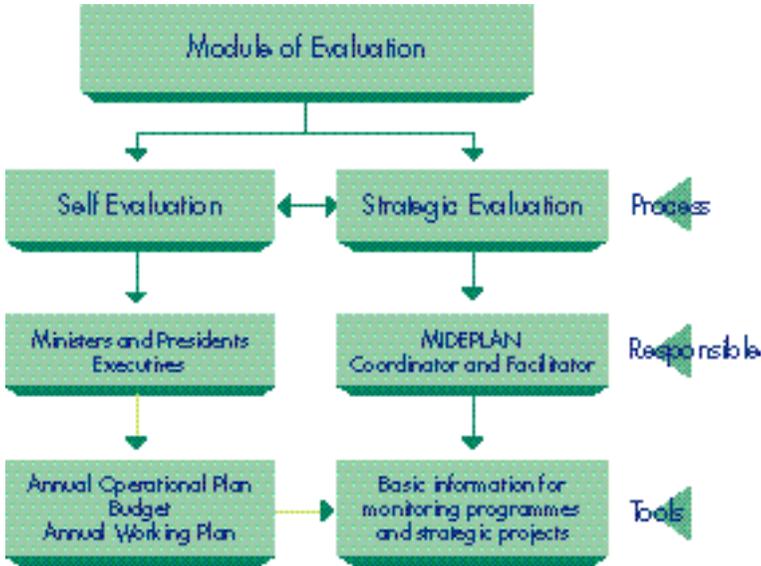
Figure 2: Assessment Process



Source: <http://www.mideplan.go.cr>

Relationships between self evaluation and strategic assessment processes, MIDEPLAN and other government departments, and alternative assessment tools are shown in Figure 3.

Figure 3: Assessment Relationships.



Source: <http://www.mideplan.go.cr>

Limiting Factors

Carrying-out Costa Rica’s vision and goals for sustainable development is an ambitious and demanding task. Limitations to achieving the vision are identified as implementation of the strategy occurs and as part of an assessment process. The successes of policy instruments addressing social, economic, environmental and institutional sectors relate back to Costa Rica’s national vision and goals for sustainable development. Political commitment is a necessary condition but it is not sufficient for the changes in decision-making processes that are required to implement sustainable development. Such transition takes time: it requires sustained political commitment and support from the general public and major stakeholders; demands changes in attitudes of people and *modus operandi* of public and private institutions; and requires the development of new institutional structures, technical capacities and financial support.

Therefore, significant limiting factors to the implementation of a far-reaching sustainable development strategy proposed by the current Costa Rican Government are related to:

Government changes: a new government might have vision and goals which are not necessarily consistent with a sustainable development approach.

Lack of a consolidated institutional framework: new institutional structures take time to be implemented and assimilated. In the case of Costa Rica, the institutional structures the government has been creating to support sustainable development policy making and implementation are in the process of consolidation.

Financial constraints: the institutional structures and technical capacities demanded for the implementation of sustainable development must be supported financially for them to be “sustainable”. Budgetary constraints faced by many developing countries become a significant limiting factor for the creation of the national capacities demanded by sustainable development.

Paradigm change: Sustainable development, more than a new concept is a new development paradigm that implies changes in personal attitudes and perceptions as well as adjustment of existing institutional structures. Those changes are difficult to assimilate by the general public and stakeholders; moreover, they take time to develop.

Key Messages

The vision and goals of sustainable development should be grounded in the historical, cultural and political development of each country. It is very important that the sustainable development vision should have political support; but equally important is that such vision and goals be shared by relevant stakeholders and the general population. These elements are of the highest importance to generate networking and to develop the institutional structure that support sustainable development initiatives. All those factors have been very important in the case of Costa Rica and can act to counterbalance the limiting factors identified above.

The Costa Rican experience demonstrates that if the vision is clear, and there is the political will to implement a strategy, the other Bellagio Principles for Assessment become self evident. The perspective for assessment becomes much broader and addresses social economic and environmental well-being. Essential elements are considered. The scope of assessment focuses on future conditions, and the process becomes transparent and open to include broad participation. The institutional capacity to support progress is addressed.

References

- 1 “Guerra a la Pobreza en Alianza con la Naturaleza” (War on Poverty in Alliance with Nature), Address of the President of the Republic of Costa Rica, Ing. José María Figueres-Olsen, at the inauguration of the international forum “From Forest to Society”, San José, May 9th, 1994, reproduced in: Figueres-Olsen, José María, *Por los Caminos del Desarrollo Sostenible*, Imprenta Nacional, San José, Costa Rica, 1995, p. 6 (free translation).
- 2 “El Futuro se Construye Hoy” (The Future is Constructed Today” Annual Report of the State of the Nation before the Congress, of Costa Rica, given by the President José María Figueres-Olsen, May 1st, 1996, reproduced in: Figueres-Olsen, José María, *Testimonio de un Tiempo de Cambio*, Imprenta Nacional, San José, Costa Rica, 1996, p. 164 (free translation).

Assessment Principle # 2: Holistic Perspective

Assessment of progress toward sustainability should:

- *include review of the whole system as well as its parts*
- *consider the well-being (including the state as well as the direction and rate of change of that state) of human, ecological, and economic sub-systems, their component parts, and the interaction between parts*
- *consider both positive and negative consequences of human activity, in a way that reflects the full costs and benefits for human and ecological systems, in monetary and non-monetary terms*

Progress BC: An Assessment of British Columbia's Progress Toward Sustainability

R. Anthony Hodge

This case study provides an overview of an ongoing project of the Government of British Columbia aimed at building an assessment of progress toward sustainability in one Canadian province. The assessment is driven by a goal of improving and maintaining human and ecosystem well-being together, not one at the expense of the other. Thus, specific measures are compiled and analyzed that describe human well-being, ecosystem well-being, and the nature of various human activities in terms of providing support for that well-being or generating stress that might detract from it. Measures are nested within the story of British Columbia — a story that helps reveal the values that will ultimately guide any assessment of the positive or negative attributes of progress.

This project is holistic by design: it attempts to maintain a perspective that links a sense of the whole system with the many parts. It demonstrates the power of doing so while also illustrating the limitations of addressing either the parts or the big picture in isolation. Within the

assessment, the judgement process is aided by the use of a scaling tool called the “Barometer of Sustainability.”

The holistic nature of this work is reflected in terms of both content and process. In content it is broadly interdisciplinary and draws heavily upon other assessment work dealing with such topics as health and human well-being, environmental conditions, the state of the economy, community resiliency, the value household, voluntary and subsistence activities, and government accountability. In implementation, it has used a collaborative, consensus seeking approach and in the continuing work it envisages a broad public discussion of the results. The result is a picture of how British Columbians are doing and how their province is fairing. It is a picture that is helpful for assessing the effectiveness of the policies and actions of individuals, the many elements of civil society, communities, and government. The project is a work in progress and will inevitably evolve as learning continues.

For more information contact:

Dr. R. Anthony Hodge
Consulting Engineer
767 Matheson Avenue
Victoria, B.C. Canada V8V 1X4
Tel: (250) 384-8080,
Fax: (250) 384-8228,
e-mail: thodge@islandnet.com

Introduction

British Columbia is the western-most province of Canada. Much of it is mountainous, just over half is considered productive forest land and less than one per cent has the combination of soil and climate to support crops. Some 80 per cent of British Columbians live in urban areas; the population is multicultural and the west coast is Canada’s fastest growing region.

Starting in the 1970s and reflecting a similar shift in attitudes across the world, increasing public concern was expressed regarding the use of resources and conditions in the environment. By the late 1980s, increasing episodes of civil disobedience were being described as the “war in the woods.” In 1992, the provincial government set up the Commission on Resources and Environment (CORE) with a statutory mandate to develop a provincial strategy for sustainable land use and related resource and environmental management. In 1995, CORE presented the government with its recommendations for a provincial sustainability strategy.

The strategy featured five key components necessary for achieving sustainability: (1) provincial direction (vision, goals and strategic direction); (2) co-ordination (among government agencies and among different interest groups in society); (3) public participation (in government planning and decision-making processes); (4) dispute resolution (mechanisms for preventing and resolving disputes); and (5) independent oversight (the capacity to independently assess progress achieved with implementation). This last component led to initiation of a project aimed at designing and testing a system for reporting on BC's progress toward sustainability. It serves as a natural complement to work elsewhere within the provincial government aimed at increasing the effectiveness of service delivery through an enhanced system of accountability and performance management.

CORE's mandate ended in March 1996 and responsibility for continuing the project was assumed by the provincial Ministry of Environment, Lands and Parks. This case study reports on progress to date.

Collaboration and Project Organization

CORE's oversight initiative recognized that the concept of sustainability extended far beyond land use and traditional environmental concerns. Issues of growth management, treaty negotiations health, poverty, crime, employment, education, the success of the economy, government effectiveness, and many other concerns were seen as equally critical. Thus, for success, the assessment would require collaboration across many government departments as well as many parts of civil society.

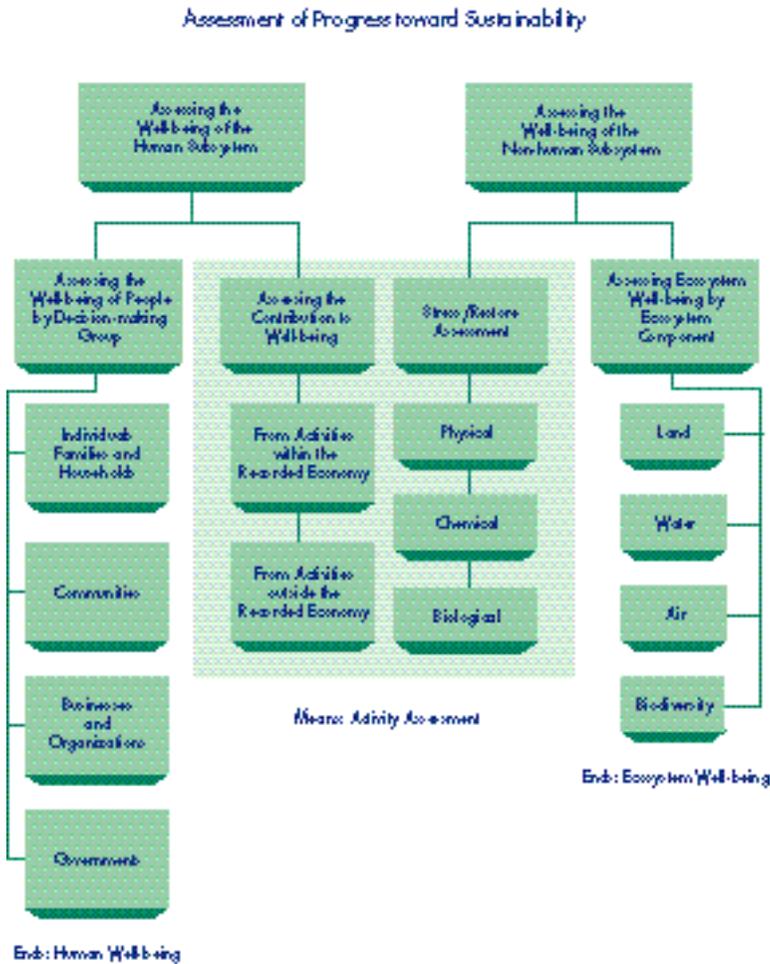
The bridging nature of this project is reflected in the wide range of government and non-government sources of data and information. To date, over 100 individuals from government and across civil society have contributed.

Foundations

This assessment includes three parts, each of which draws on a different kind of expertise. First, the story of British Columbia is articulated — a story that helps reveal the values that will ultimately guide any assessment of the positive or negative attributes of progress. Second, a series of measures are compiled that track state and trends over time. Thirdly, a judgement process is undertaken that provides the assessment of current conditions and trends — individually and collectively — and whether they might be described as sustainable, unsustainable, or somewhere in between.

The starting point of this project is articulation of a particular goal of sustainability: improving and maintaining the well-being of people and ecosystems together. From this starting point emerges the need to monitor and assess both human and ecosystem well-being as well as the nature of various human activities (within the economy as well as outside such as housework, voluntary and subsistence activities) in terms of providing support for that well-being or generating stress that might detract from it. While human and ecosystem well-being are the desired ends, human activities are the means. The generic assessment framework for Progress BC is shown in Figure 1.

Figure 1: Generic assessment framework for "Progress BC"



Assessment Hierarchies and Indicator Choice

Any assessment process follows a train of logic that starts with choosing some broad category of interest (say water quality or human health) and is followed by identifying a suite of sub-categories that may in turn be subdivided into a series of specific measures. Thus, a hierarchy of data and information can be mapped in the manner of Figure 1, with specific measures at the base. As understanding grows or as priorities change, these assessment hierarchies evolve. In this project, the particular choice of indicators emerged from work over the past decade, and from discussions with civil servants, professionals, academics, and representatives of non-government organizations.

Assessing Human Well-being

For this assessment, human well-being is defined as a healthy population living in a thriving set of communities with established and respected systems of governance, justice, education, and social support; a prosperous and vibrant economy; a well-built infrastructure; flourishing arts, cultural and recreational activities; and opportunities for citizen involvement in decision-making processes affecting their interests. Society is categorized as comprising four “centres of action and decision-making” including: individuals, families, and households; communities; businesses and organizations; and governments. The assessment of how people are doing also includes a look at activities (paid and unpaid) and the nature of how those activities have contributed to well-being.

Assessing the Wellness of Individuals, Families, and Households

Six indicator sets were chosen to describe the state and trends of individual, family, and household wellness: (1) health status; (2) education achievement; (3) paid work; (4) income and earnings; (5) poverty and debt; (6) crime and security.

Assessing Community Strength and Resilience

This part of the assessment remains to be completed.

Assessing the Diversity and Success of Businesses and Organizations

Five components of civil society are assessed: (1) for-profit business; (2) unions; (3) co-operatives; (4) societies; and (5) universities, other post-secondary education and training organizations.

Assessing the Effectiveness of Government

Four orders of government exist in BC: federal, provincial, local, and First Nation. Each has the responsibility to assess effectiveness, a task which remains to be done. Only the provincial government has initiated an assessment.

Assessing the Success and Vibrancy of the Economy and Unpaid or “Non-recorded” Activities

A summary of value added and employment by industry is provided as well as an assessment of the value of unpaid household work, the underground economy, and voluntary activities. Economic trends since 1961 were reviewed both in traditional terms (GDP, productivity, balance of trade) as well as in a new “Index of Sustainable Economic Welfare (ISEW)”.

Assessing Ecosystem Well-being

In this project, ecosystem well-being is defined as a condition in which ecosystems maintain their diversity, productivity and resilience such that they are able to provide a wide range of choices and opportunities for the future and are able to adapt to forces of change. Ecosystem well-being does not imply keeping things as they are today or returning to how they were 200 years ago. Rather, it implies maintaining the evolutionary capacity of the ecosystem.

The assessment of ecosystem well-being is organized in terms of: (1) land; (2) water; (3) air; (4) biodiversity; and (5) community resource use. This fifth element addresses energy use and waste generation, two activities that cut across almost all aspects of human endeavour and are particularly important in terms of stresses imposed on the ecosystem.

Land

The state of BC’s land base was described by a land naturalness index and a land quality index.

Water

Surface water, groundwater, and coastal marine waters are addressed in terms of quality and quantity as appropriate. An index of watershed naturalness is also presented that provides a watershed analogy to the index of land naturalness.

Air

Local air quality and the state of the upper atmosphere are addressed.

Biodiversity

Indicators are compiled that address ecosystem, species, and genetic diversity of not only wild organisms but also domestic crops and livestock.

Community Resource Use

Community resource use is addressed in terms of energy use and waste generation and disposal.

Resource Industries: Benefits and Stresses

For each of the food, timber, and mineral industries, economic and other benefits are described (the contribution to well-being) as well as the stresses imposed on the ecosystem.



City of Vancouver, Southwestern British Columbia

The Approach to Judging Progress

In this project, coming to a judgement about the nature of progress includes three parts (not necessarily in order). Firstly, provincial aggregates are considered that in some cases facilitate comparison with other jurisdictions or an existing target on an indicator-by-indicator basis. Secondly, where possible, sub-population or sub-regional splits are considered that allow consideration of equity and disparity or regional variations in conditions. Thirdly, a synthesis is compiled and an overall assessment of progress generated. Thus, in the judgement process itself, a holistic approach is taken that is sensitive not only to the conditions of the parts but also to the state of the whole.

Where the necessary data are available, Prescott-Allen's scaling tool called the Barometer of Sustainability is used. Application involves: (1) establishing a performance scale (on a dimension-less scale of 0 to 100) for any given measure that ranges from "good" to "bad" based on set targets, experience elsewhere, or simply judgement; (2) placing the measurement on the scale and carefully documenting why it is so placed; (3) synthesizing the results to provide an overall sense of progress. Because the performance scale is dimension-less (like the Human Development Index of the United Nations Development Programme), indicators can be numerically weighted and integrated. Ultimately, the Barometer combines an index of human well-being and an index of ecosystem well-being into a single (but two-dimensional) index of progress toward sustainability.

There are many elements of the assessment that are not amenable to analysis with the Barometer. However, it is particularly useful because it facilitates a rigorous and systematic documentation of the logic and rationale that are used. It thus helps to clarify thinking and forces a high degree of discipline and transparency in the assessment process. These characteristics are essential if credibility is to be maintained and the opportunity for learning maximized. The Barometer is also helpful in generating a conclusion to aid policy makers, even though there may be a high degree of uncertainty. Finally, it offers an effective mechanism (numerically and graphically) to communicate the result.

Preliminary Results: An Assessment of British Columbia's Progress toward Sustainability

The preliminary results presented below demonstrate the strength of addressing the whole plus the parts, not one or the other in isolation.

Human Well-being

The wellness of individuals, families, and households:

Overall, British Columbians are among the healthiest in the world but this observation is offset by serious inequities between regions and population groups.

First Nations' well-being: First Nations' people life expectancy is 12 years less than the overall population; infant mortality is twice that of the general population; suicide rate of 15-24 year-olds is six times the overall rate for this age group; education attainment levels are lower; poverty and unemployment rates are higher.

Overall, British Columbian's education levels are higher than the Canadian average.

Unemployment rates are currently twice the rate they were in 1966. Unemployment in the 15-24 year old age group is particularly high. The average number of weeks unemployed has also increased particularly for those 45 years old and over.

Real average weekly earnings per employee have decreased in the last decade while the medium income of families and unattached individuals remained constant likely reflecting a shift to two income families as more women enter the paid labour force.

Income inequality between the rich and the poor has grown although to date, income redistribution programs have been effective in counteracting this trend.

Poverty: One in six British Columbians are classified as living in poverty. Women experience greater poverty than men; single mothers have the highest incidence of poverty; youth poverty is increasing.

Consumer debt: The ratio of per capita personal debt to income has tripled since 1988.

The overall crime rate in BC has declined in the 1990s but remains higher than in other Canadian provinces. The rate of the most violent crimes is decreasing, while that of the least serious crimes is increasing. The public perception of a deepening crime problem, especially violent crime, is not supported by available data.

The diversity and success of businesses and organizations:

For-profit business in BC is diverse, responsive to change and resilient.

Jobs and unionization: From 1983 to 1996 the greatest job growth was in small and medium business, self-employment was second while the slowest growth was in large firms. The proportion of jobs supported by large firms has dropped. BC leads every province in the rate of growth of small business. Small businesses are the largest source of new union members. The number of self-employed women is increasing at double the rate of self-employed men.

Union membership as a proportion of total paid workers declined but has now stabilized. Membership has increased in the services sector. The proportion of women in unions is rising.

About half of all British Columbians belong to credit unions and co-operatives. The performance of credit unions has been stronger than banks and they now have a 20 per cent share of the deposit-taking market.

Some 34,500 societies are registered in BC, of which about 18,500 are active. An additional 1,500 are incorporated every year suggesting an active community spirit.

Post-secondary education and training organizations are diverse. BC's participation rate in publicly supported post-secondary programs is below the national average and below all other provinces except Manitoba and Saskatchewan. Some 900 unregulated private colleges or institutes operate in the province — close to half those operating in Canada. BC universities consistently score well in national rankings.

Community strength and resilience:

This component of assessing progress toward sustainability was not possible to undertake within the limits of this project.

Government effectiveness:

These assessments lie within the purview of each order of government and their completion is beyond the scope of this project. In BC, only the provincial government has initiated an assessment of its own effectiveness. This work is ongoing.

State of the economy:

Overall economic strength: Value added and employment have grown steadily since 1961. Market services have grown the most.

An Index of Sustainable Economic Welfare (ISEW) shows overall growth since 1961 but at about one third the growth rate of the GDP.

Labour productivity has dropped since 1987.

Trade balance: BC trade is in deficit due to imports from other provinces exceeding exports.

The economy and the contribution of non-recorded activities: In 1992-1993, the value of recorded economic activity included \$17.9 CAN billion for goods producing industries, \$37.2 CAN billion for market services and \$8.7 CAN billion for non-market services. The estimated value of activities outside the economy is \$36 CAN billion for unpaid household work (1992), \$1.6 CAN billion for voluntary activity (1987) and \$2.6 CAN billion for the underground economy (1992).

Overall, the above set of indicators suggest that the well-being of British Columbians is fairly good. This conclusion is supported by the comparative analysis facilitated by the Barometer of Sustainability. However, it must be tempered by the inequalities that continue to exist and in some cases grow within BC society.

Ecosystem Well-being

Land:

Land naturalness index: In 1990, 63 per cent of the land was still natural, 35 per cent modified, 1 per cent cultivated, and less than 1 per cent built. These percentages result in a land naturalness index of 81 (out of 100) for 1990. The current index is higher than those of most countries in the world.

Land quality index: The index of land quality, on the basis of water erosion, improved from 82 (out of 100) in 1981 to 83 in 1991.

Water:

The water quality index measures the quality of water bodies that people use directly and hence are likely to be polluted. Of 112 fresh water bodies (surface and ground) for which water quality objectives have been set, 8 are excellent, 43 good, 52 fair, 4 borderline, and 5 poor. Of 12 marine water bodies, 1 is excellent, 1 good, 9 fair, and 1 borderline.

Shellfish harvesting closures: 23 per cent of the surveyed shellfish harvesting area along the southern coast is closed each year. The northern coastal areas are less exposed to municipal discharges and agricultural runoff and a smaller proportion of harvesting areas is closed.

Air:

On average, community air quality is moderate. Carbon monoxide levels are declining and nitrogen dioxide levels are fair. Sulphur dioxide, ground-level ozone and total reduced sulphur are problems in some communities. Concentrations of fine particulates are above the point where they start damaging health in almost all BC where data is available. They are particularly high in many interior communities.

The condition of the atmosphere is worsening, and BC's impact is out of proportion to the size of its population and economy. BC's greenhouse gas emissions are high (58 million tonnes in 1990) and growing. Over southern BC, the stratospheric ozone layer is 4-16 per cent thinner than it was before 1980 and average ultraviolet B radiation levels have increased.

Biodiversity:

Ecosystems at risk: A third of BC's plant communities are at risk. Most are in the south.

Protected areas: About 8 million hectares (more than 8 per cent) of the province's land and freshwater area are fully protected. Coverage of ecosystem diversity is uneven: about a third of BC's 77 biogeoclimatic subzones are well protected; but almost half are inadequately protected.

Proportions of species at risk are high, particularly in the south: 3 per cent of higher plant species are globally at risk, and another 26 per cent are provincially at risk; 4 per cent of higher animal species are globally at risk, and another 22 per cent are provincially at risk. The most threatened groups are fishes and ferns.

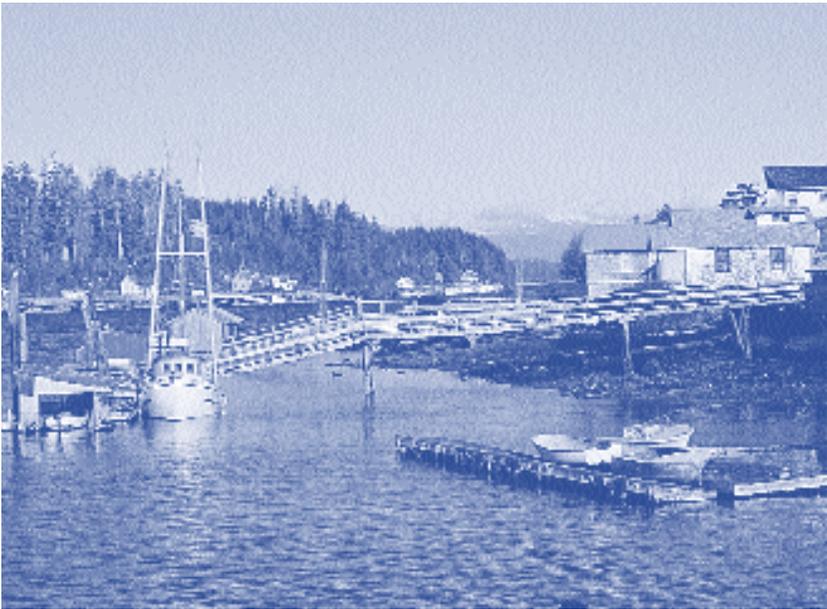
Salmon and trout at risk: Of 9,663 identified stocks of salmon and sea-run trout in BC and the Yukon, 1.5 per cent are extinct and almost 10 per cent are threatened. The status of 43 per cent is not known. The highest proportion of stocks at risk is around Vancouver Island.

Resource use:

Per capita consumption of energy is higher than the Canadian average, which is higher than most other countries. Energy use per dollar of GDP has dropped steadily since 1980.

Waste disposal: British Columbians have reduced the amount of waste disposed each year from 970 kg per person in 1990 to 600 kg in 1994 but these levels remain close to double many European countries.

Together, the above indicators for land, water, air, biodiversity, and resource use suggest that the average condition of the ecosystem of British Columbia is moderate. This conclusion is supported by the comparative analysis facilitated by the Barometer of Sustainability. However, this big-picture view is misleading and must be tempered by what is revealed through more detailed regional analysis. Large parts of the province — wherever there are few people and economic activity is light — are still in a natural or near-natural state. By contrast, wherever people are concentrated, natural areas are small and fragmented, diversity is threatened, and the condition of the ecosystem is no better than in other industrialized countries.



West Coast fish stocks are under stress

Resource Industry Stresses and Benefits

The Food Industry:

The food industry (agriculture, fishing and aquaculture, food and beverage manufacturing) contributes 3 per cent of total GDP and employment. Four municipalities rely on the industry for 10 per cent or more of total employment. The industry has the second biggest impact on the land and biodiversity (after timber) and major impacts on water and air quality. Fishing is the main cause of reduced populations of 10 of 43 marine species.



Timber harvesting practices raise social and environmental concerns

The Timber Industry:

The timber industry (logging, forestry, wood manufacturing, paper and allied products manufacturing) contributes 8 per cent of total GDP and 6 per cent of employment. Thirty-four municipalities rely on the industry for 20 per cent or more of total employment, and another 36 depend on it for 10-19 per cent. The industry has the biggest impact on the land and biodiversity of all industries, modifying almost 40 per cent of the province. It is one of the two biggest sources of local air pollution (equal to community sources that include transportation), and has major impacts on water quality.

The Mineral Industry:

The mineral industry (mining and quarrying, crude oil and natural gas extraction, mineral products manufacturing, refined petroleum and coal products manufacturing) contributes 4 per cent of total GDP and 2 per cent of employment. Seven municipalities rely on the industry for 20 per cent or more of total employment, and another nine depend on it for 10-19 per cent. Mining is a major source of water pollution, the biggest source of sulphur dioxide, and the second biggest source of greenhouse gases.

Principle Conclusions of Progress BC

1. With the average condition of people being fairly good, and the average condition of the ecosystem as moderate, the overall condition of British Columbia lies somewhere between sustainable and unsustainable.

This conclusion must be considered preliminary because of the lack of widely representative participation in the judgements made throughout the report and some significant gaps in information and data.

2. British Columbia's capacity to monitor, assess and report on change and sustainability is weak and fragmented.

Individual aspects of the condition of people and the ecosystem in BC are monitored and reported on separately and incompletely. This sectoral and fragmented approach results in omissions and duplication. It makes it extremely difficult to view the whole system, assess accountability in terms of results, or promote human well-being and ecosystem well-being together. It prevents both government and the public from seeing where the province is going.

Revisiting Bellagio Principle for Assessment # 2: Holistic Perspective

Progress BC demonstrates an approach to articulating a goal of sustainability and defining the large universe of data and information needed for assessing progress toward this goal. Further, it lays out the general domains of data and information that comprise this universe as well as the detailed constituent measures. Measures are compiled and analyzed that describe human well-being, ecosystem well-being, and the nature of human activities in terms of providing support for that well-being or generating stress that might detract from it. This data and information is nested within the story of British Columbia — a story that helps reveal the values that will ultimately judge progress achieved as good, bad or somewhere in between.

In judging progress, assessment is made of both the detailed measures as well as the system as a whole. The judgement process is aided by a scaling technique, the Barometer of Sustainability, that facilitates comparing state and trends with conditions in other jurisdictions or to set targets when they are available. It facilitates a more rigorous and transparent approach to judgement than would otherwise be possible and the resulting indicator is effective for communication.

From conceptual framework through synthesis to judgement, the approach taken by Progress BC reflects holistic ideas and a commitment to drawing insight both from individual parts as well as a sense of the whole. The process now initiated is one of continual learning. Conclusions drawn from this initial assessment will mature as more and different data and information emerge and as a broader group of British Columbians are engaged. What is most important is that the courage is found to make, document, and communicate judgements within the holistic, long term, and broad spatial perspective of sustainability.

Assessment Principle #3: Essential Elements

Assessment of progress towards sustainable development should:

- *consider equity and disparity within the current population and between current and future generations, dealing with such concerns as resource use, over-consumption and poverty, human rights, access to services, as appropriate*
- *consider the ecological conditions upon which life depends*
- *consider economic development and other, non-market activities that contribute to human/social well-being.*

The Future of the Global Environment: A Model-based Analysis Supporting the United Nations Environmental Programme's First Global Environment Outlook (UNEP GEO-1).

Jan Bakkes and Jaap van Woerden

Summary: The objective of the analysis is to assess global environmental issues through analyzing a 'business-as-usual' scenario for the coming decades, using region-specific integrated models, in order to support priority setting in environmental policy. The analysis uses spatially explicit models and takes into account linkages between the issues.

Core indicators were used for scenario assessment of technology and structural changes compared to the status quo.

The analysis addresses:

- future consequences of present policies, including options for alternative policies; and
- differences between regions of the world in terms of what the challenges of sustainable development are and what progress is being achieved.

For more information contact:

Jan Bakkes (project leader), Tel: +31.30.2743112, Fax: +31.30.2744435

e-mail Jan.Bakkes@rivm.nl

Jaap van Woerden, Tel: +31.30.2743346, Fax: +31.30.2744427

e-mail Jaap.van.Woerden@rivm.nl

National Institute of Public Health and the Environment (RIVM)

P.O. Box 1, 3720 BA Bilthoven, The Netherlands

<http://www.rivm.nl> and <http://www.geo.rivm.nl>

Context

This case study addresses essential elements for assessment from experience since 1993. During those years the National Institute of Public Health and the Environment (RIVM) analyzed a 'business-as-usual' scenario as one element of the first Global Environment Outlook (GEO). This analysis identified the most pressing environmental problems for the coming generations, how the environmental problems developed from the past, and what the main challenges are for the next generations to address them.

The Global Environment Outlook is a participatory environmental assessment project incorporating regional views and perceptions and obtaining consensus on priority issues and actions. GEO-1 is the product of a collaborative effort of the United Nations Environment Programme (UNEP) and 20 international centres around the world. This project is analyzing important differences in the world regarding environmentally sustainable development. GEO-1 is an interim balance for Agenda-21, five years after 'Rio' and five years before UNEP's next global State of the Environment Report in 2002.

Components, output, time frame, main stages

UNEP initiated GEO in 1993 as a follow up to 'Rio' in an attempt to answer the call for global, integrated assessment in support of environmental policy. Following the request of UNEP's Governing Council, GEO was designed as a series of regular assessment reports of the global environment. Each report will build on the previous one, expanding scope, methods and participation.

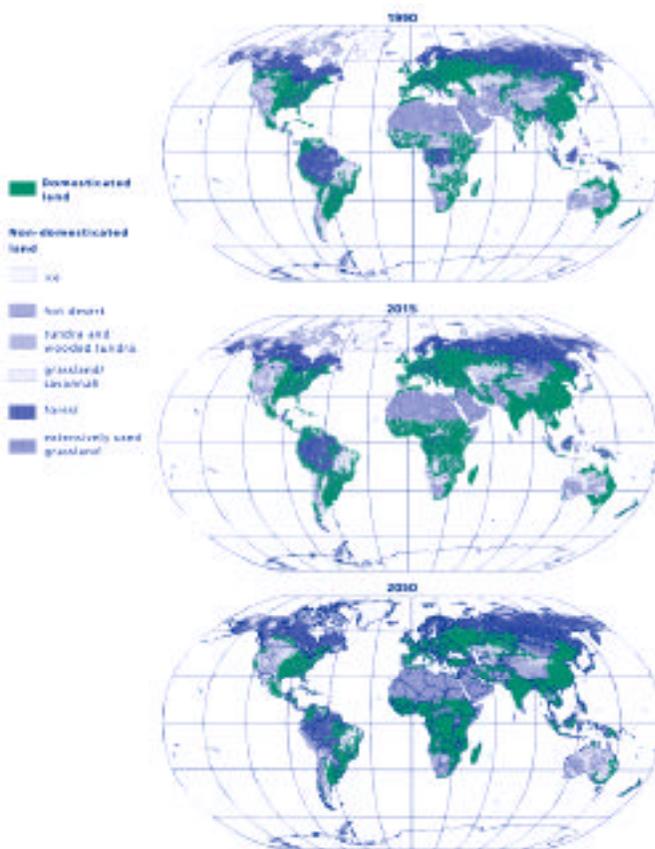
The GEO-1 project was conducted between 1994-1996. The report was published in January 1997. GEO-2 is scheduled for 1999. The next iteration, GEO-3, will be published as the 2002 State of the Environment Report. GEO reporting is scheduled to continue at regular intervals.

GEO's main products are the assessment reports and background documents. The assessments build on increasing regional participation and

capacity building. They maintain a global perspective through integration of specific issues that are important in specific regions (bottom-up) and application of comprehensive models to systematically scope outlooks (top-down).

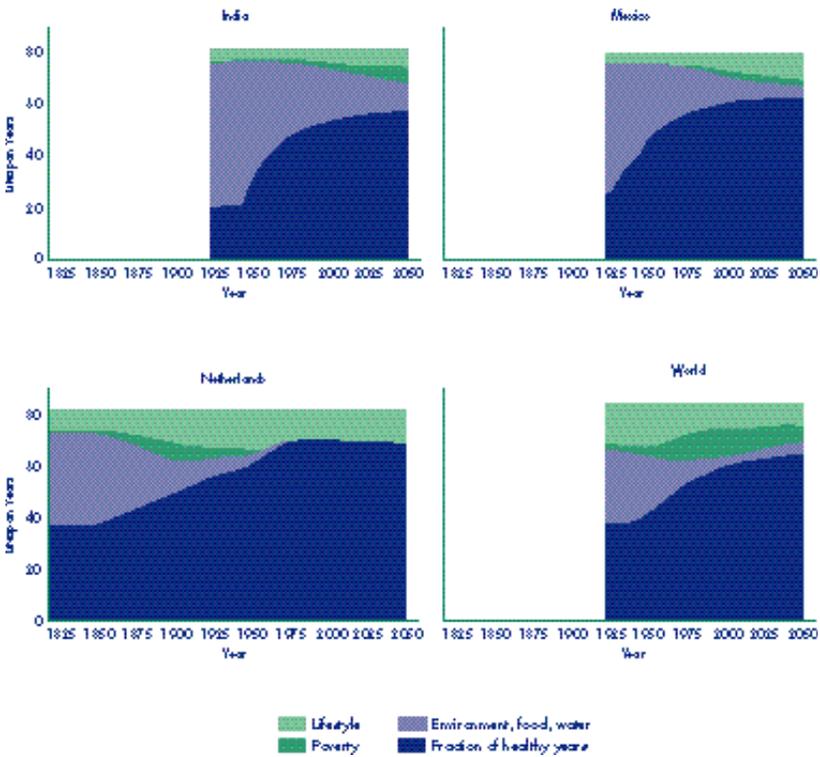
The GEO-1 scenario analysis focuses on climate change, acidification, the use of land and water, biodiversity and human health issues. Comprehensive environmental assessment techniques, including modeling, scenarios, and indicators, have produced region-specific long-term forecasts. Environmental indicators are used to describe and present these issues. For example, Figure 1 shows the rapid conversion of natural areas into agricultural or other domesticated uses, in particular in Africa and India. Domesticated land is in green.

Figure 1: Projected changes in the distribution of domesticated land and natural land cover types



Another example relates to the issue of human health. Figure 2 shows the Disability-Adjusted Life Expectancy years or “DALEs”. India, Mexico and the Netherlands are in different stages of demographic and health transition. Note the change in relative importance of the different factors of health loss. Projections suggest life expectancy will continue to rise in developing countries and also world-wide, mainly as a result of rising average prosperity.

Figure 2: Past and projected Disability-Adjusted Life Expectancy years (DALEs), for India, Mexico, Netherlands and the world as a whole.



GEO-1’s ‘Conventional Development’ scenario analysis concludes that the main global environmental issues are the use of land, water and energy. Driven by population growth and increasing meat consumption, agriculture will expand at the cost of natural habitat, threatening biodiversity. This may occur particularly in developing countries (see also Figure 1).

Many more people will be affected by water shortages. And increasing use of energy will result in substantial temperature rise and stronger acidification. Just to keep environmental pressures by 2050 at current levels, resource efficiencies would have to increase by a factor of 4 to 5. Due to regional inequalities, a factor of 20 may be needed in specific areas.

In a first attempt to include more than one possible future in the analysis, a core set of indicators was used to assess the effects of the transfer of Best Available Technology to all parts of the world, variant 1, as well as the additional effect of a structural change in the human diet pattern, variant 2. Table 1 shows six indicators for these two variants compared to the Conventional Development (CD) scenario. The analysis suggests combining the implementation of the two variants would result in significant global progress toward sustainable development. Please note that these variants are not fully developed realistic scenarios, but an exploration of the theoretical maximum impacts of enhanced policies.

Table 1: Potential environmental gains of two different policy strategies, 1990 and 2050

Indicator:	1990	2050		
		CD	variant 1	variant 2
Primary energy consumption (EJ/yr)	370	1032	490	398
Number of cattle (millions)	1413	2491	789	495
Carbon dioxide emissions from energy & industry (Pg C/yr)	6.3	15.0	6.4	3.2
Agricultural land (Mha)	4854	6433	3991	3510
Forest land (Mha)	4241	3332	4806	5152
Temperature change (°C)	0	1.5	0.8	0.5

Data Sources

Region-specific assessment studies like the GEO-1 scenario analysis require vast amounts of statistical and geographical data sets describing the current and historic 'state of the world', including population, economy and climate. A comprehensive list of such core data sets has been established by the Data Working Group in 1996, and is available as the GEO-1 meeting report or on the Internet (<http://www.coredata.rivm.nl>).

In addition to factual data, the analysis needs assumptions for the future for the forces driving global change, such as population and economic growth, and technological change. Required also is information on major environmental concerns as well as policy targets and measures already in place through global and regional conventions.

Challenges

Chicken and egg

The most difficult challenge was how to resolve the chicken and egg dilemma: to provide a sample outcome of a user-driven, participatory process in order to start such a process for the first time. An extra handicap is that the experiences with integrated environmental assessment is concentrated in industrialized countries, leading to the challenge of how to truly adapt this experience to other issues and other perspectives.

This challenge was met by adopting a pragmatic or 'just do it' approach. The assessment framework was developed and applied in-house. The results were presented to scientific and regional experts in the field, thus provoking reactions on something that one knows beforehand to be far from perfect. This process, mainly facilitated by UNEP's regional offices and collaborating centres, proved crucial for building up the assessment as a product of world-wide regionally balanced policy consultations and scientific reviews.

Technical language

A third challenge is to translate findings from highly technical language to information that can be used by the targeted audience i.e., national and international policy makers and scientists. This was attempted by presenting the model results in clear overviews for the six UNEP regions, by including separate sections on key findings and policy options and by repetitive rewriting of the main text. The set-up with a main GEO report and several technical background documents helps to serve more and less specific audiences at the same time. Putting the reports on the Internet, linked to an edited Web version, makes this information available to yet another public audience.

Flexibility

A fourth challenge was to allow flexibility while retaining work planning with many competing projects and ensuring due quality control. A simple, but important provision, is to include flexibility in formal project

planning, in this case by inserting a formal statement that many revisions would be required. A complex, international project like GEO also requires a dedicated team, capable of coping with frequent changes on short notice. The involvement of the institute's management and investing some of its own research funds increases support and flexibility. The latter works not only by enlarging the resource envelope, but also because these funds carry less strict tagging.

Timeliness

A final challenge has been to organize ample consultation of regional policy makers and peer scientists, and still deliver the results in time for the international meetings that review progress since 'Rio'. The strategy has been to make GEO-1 the most important product of our organizations.

Audience

GEO-1 aims at providing an overview of results achieved five years since 'Rio', as an input for UNEP's 19th Governing Council (February 1997), for the session of the Commission on Sustainable Development in April 1997 and for the Special Session of the UN General Assembly (June 1997). The primary audience is national governments and international organizations. Typically, the readers would be ministerial advisors, delegates, and journalists. This applies equally to the main report and the scenario analysis. In addition, the report on the analysis of the scenario aims at providing the critical "semi-specialist" an account into the methodology that has been used.

Does the GEO-1 Scenario Analysis Cover all Three Essential Elements of Sustainable Development?

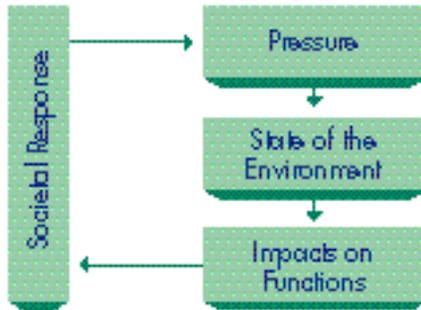
How the scenario analysis for GEO-1 relates to the principle.

The scenario analysis for GEO-1 does take into account people, the environment and the economy. In accordance with UNEP's call, it focuses on those developments that work via the physical environment. However, the forces that drive change (such as demography, technology), the impact on functions (such as food production), aggravating factors (such as poverty and urbanization) and policy responses, indeed, expands the analysis beyond the traditional boundaries of environment assessment.

Approach taken in determining the scope of the study

The preparations for the scenario analysis for GEO-1 included designing a conceptual scheme. This drew on experiences with integrated assessment on other scale levels (Netherlands, Europe, Asia) and specific issues (climate, human health, river basin management). A draft report describing the conceptual scheme and other aspects of the proposed analysis was widely circulated about a year before the actual study (see Swart and Bakkes, 1995). Although this framework description is very abstract when read separately, the process of compiling and reviewing it facilitated early discussion between UNEP and RIVM about the eventual assessments and their feasibility. See Figure 3 for the basic conceptual scheme.

Figure 3: A simple representation of the pressure-state-impact-response framework



In order to determine the scope of the scenario analysis in more concrete terms, a balance needed to be struck between importance of issues and available means and knowledge. RIVM started a range of short methodological studies on how available models, scenarios and data could be combined in a pragmatic way. In addition, at various stages prototype reports were pulled together: real examples of what the eventual report could look like. Short consultations with experts, with candidate collaborating centres and with UNEP regional directors were organized.

This process resulted in dropping issues like coastal zone problems; spreading of toxic chemicals; urban problems; and land degradation. It retained issues like climate change/acidification; land and food; water stress; health and demographic transitions; and land-based biodiversity. In retrospect, it is not exactly clear what argument weighted most in each case. However, the overriding criterion has been to find the combination

of issues and feasibility that would best demonstrate the overall idea of the assessment series in an inviting way to future users and other participants.



GEO-1 project participants

Challenges in influencing width and depth of the assessment, and the manner in which they have been dealt

Data

Although there seem to be many data sets around, validated, up to date, and complete world-wide data sets are scarce and the organization around them is imperfect. Data constraints are especially important to GEO because this project aims to assess regional differences. In order to support non-trivial conclusions, the regional differences in turn need to be assessed via a much finer grain analysis, taking into account the large economic, environmental and demographic differences within each world region.

Because the analysis needed to look much wider than environment alone, many data outside the conventional environmental domain were needed as input. For example, energy efficiencies, soils, for the agricultural sector, climate, income, demography, and health data were used.

In response to the data scarcity a global working group on data for integrated environment assessment was initiated by UN agencies (see also 'Data Sources'). For immediate action on GEO-1, RIVM set up an in-house group for international data logistics. Spatial and other modeling techniques were used to convert data to other breakdowns, to fill-in or smooth data gaps and to solve other data problems.

This response was good enough in order to make the compilation of GEO-1 possible. However, future GEO's will have to assess progress since the first report. Thus, they will face even more severe data problems, especially regarding timeliness of data. Improved collaboration between key global and regional organizations is a prerequisite.

Scientific knowledge

In a project like this, limits to scientific knowledge and operational models can be expected. Moreover, a look at scenario analyses that took place during the last decades makes it clear how time bound our understanding is. Basically, these limits are a given and can only be pushed slowly, by well-targeted research investments. In contrast, the basic approach for GEO has been to make the best use of *available* scientific knowledge.

The most important long-term action on this aspect has been that UNEP has set up a globally balanced network of centres that should link to both the scientific and the policy communities. Later, this can be complemented by other means of intelligence gathering, for example surveys among scientists, including political scientists.

In order to jump start the model-based analysis for GEO-1, RIVM used base models that originate from climate change research. This choice was made because only these spatially detailed models would allow analysis of regional differences. Ongoing work on other aspects, such as vector borne diseases, water stress and pressure on terrestrial biodiversity was 'hooked up' to this — often starting in an ad hoc fashion during the compilation of prototypes for discussion.

UNEP organized extensive peer reviews for GEO-1, paying attention to the regional balance within the peer group. In terms of models, UNEP together with DPCSD and the United Nations University has set up another global working group of experts on modeling.

Scenarios

Only one, incomplete, world-wide baseline scenario with enough detail was available.

In response, UNEP has commissioned the Stockholm Environment Institute to make the one existing scenario suitable for subsequent model-based analysis. During the analysis, RIVM worked on interpreting the existing material further and added rough variants in order to explore the maximum effect of enhanced policies for technology transfer and consumer behaviour. As a longer term attempt to develop more fundamentally different views on the future, UNEP initiated a global scenario group (the third global working group).

The bottom line is that this particular problem has not been satisfactorily resolved for GEO-1. During consultations it became clear that, notwithstanding academic explanations, too many people interpreted the analysis of only one scenario as a prediction — rather than understanding that this was a set of assumptions and a starting point to reflect on what enhanced policies are needed.

Evaluation

In retrospect, the analysis and the conclusions of the GEO-1 “look to the future” do take into account environment, people and the economy. However, the degree of elaboration is obviously uneven on a number of points. First, in GEO-1 important aspects such as per capita income, inequality, the fraction of unskilled labour, trade flows and shifts between sectors and countries have been introduced into the analysis from the outside or have been attached later on. This makes it more difficult to extend conclusions to those domains.

Second, the analysis of developments in the environment also has obvious gaps. For some areas, such as fisheries, it will be difficult to provide knowledge and data for the assessments. For other issues, such as land degradation, or the relation between water stress factors at global and river basin levels, there is more optimism about ways for integration into following assessments.

Third, the possible impacts of stronger policies have only been analyzed as an add-on, and in a rudimentary fashion.

Balancing the shortcomings is the fact that the ‘just do it’ approach to the challenges and constraints enabled the organizers of GEO to assess different environmental issues in a broader context and to involve many players in an ongoing process.

Recommendations that May Apply in Other Situations

An imperfect but real study is a good means to kick off a complicated assessment process, if it is explained clearly that there will be future opportunities with wider participation. Such a pragmatic start is found to be more effective and accessible than an abstract discussion on rules and methodology for the assessment.

If possible, existing networks should be used for stakeholder consultation. With respect to the identification of essential elements, the good thing about existing networks is that it is to some extent established and clear whom they represent. This provides better grounds for decisions on any additional consultations. An unrelated advantage is that existing networks are a quicker way to get responses from envisaged users, and speed is important.

A separate phase for determining the scope of the assessment can help to more effectively address the question of which topics should be covered in the assessment. Environmental Impact Assessment legislation in some countries contains good guidelines that can be applied in assessments with a wider scope. If the assessment process is repetitive, the comments on an preliminary versions are also a good vehicle for a discussion on scope and the evaluation framework to be used in the next assessment.

Models are an almost indispensable tool in order to systematically analyze equity between present and future generations and between the regions of the world. However, not all essential elements lend themselves to quantitative modeling or the necessary knowledge is lacking to do so. But the assessment story can help to give model outcomes a meaning beyond the isolated indicators that are quantitatively treated. The story can introduce overarching concepts, such as the notion of 'transitions' that was used in GEO-1. The story can also highlight patterns, introduce examples and, last but not least, spell out the political meaning of the findings.

An assessment of priorities and progress toward sustainable development is like organizing an interface between science and policy. It needs clearly defined partners on each side, and an institutional home. A comprehensive global assessment can follow this scheme, but needs supporting structures because it quickly involves many organizations spread out over the globe. GEO developed supporting structures to bridge towards scientific and monitoring organizations (the three global working groups); towards policy makers (consultations in each of the six regions). It adopted a particularly elegant approach for the institutional home at the actual

interface between science and policy, in the form of a network of 20 collaborating centres.

And last but not least, as with many complex studies, it has been both stressful and helpful to have an inflexible deadline for the final assessment to reach the users.

References

Discussed as case study:

Bakkes, J.A. and J.W. van Woerden (eds.). *The Future of the Global Environment: A model-based Analysis Supporting UNEP's First Global Environment Outlook*. RIVM Bilthoven and UNEP Nairobi, 1997. RIVM 402001007 and UNEP/DEIA/TR.97-1.

Main GEO-1 report:

Global Environment Outlook. United Nations Environment Programme (UNEP), Nairobi. Oxford University Press, New York and Oxford, 1997.

On assessment framework:

Swart, R.J. and Bakkes, J.A. (eds.), Niessen, L.W., Rotmans J., Vries, H.J.M. de, Weterings R. *Scanning the Global Environment: A framework and methodology for integrated environmental reporting and assessment*. RIVM, Bilthoven and UNEP Nairobi, 1995. RIVM report 402001002 and UNEP/EAP/TR/95-01.

On data sources:

Report on the Meeting on Integrated Environmental Assessment/Global Environment Outlook (IEA/GEO) Core Data Group. DPCSD Office, New York, 22-23 January, 1996. UNEP, Nairobi, 1997. UNEP/DEIA/MR.97-1. Reprint of UNEP/DEIA/MR.96-3.

GEO reports and related information have also been made available through the Internet (<http://www.grida.no/prog/global/geo1> and <http://www.geo.rivm.nl>).

Assessment Principle # 4: Adequate Scope

Assessment of progress toward sustainability should:

- *adopt a time horizon long enough to capture both human and ecosystem time scales thus responding to needs of future generations as well as those current to short term decision-making*
- *define the space of study large enough to include not only local but also long distance impacts on people and ecosystems*
- *build on historic and current conditions — where we want to go, where we could go*

Regional Sustainable Development in the Feldbach Region of Austria

Michael Narodoslawsky

Summary: This case study describes an assessment of agricultural development in the Feldbach region in south-eastern Austria. This assessment was done during the Ecological Region Feldbach with Integrated Technology, ECOFIT (OEKOFIT in German) project.

Ecological time frames and global spatial scales were assessed. Results of this research indicated that present agricultural practices were unsustainable. Opportunities for achieving progress have been identified.

The ECOFIT project created a foundation for future progress in the Feldbach region. This assessment helped the Feldbach region in deciding the direction, steps, and institutional arrangements that would be needed to achieve a regional sustainable development strategy. Since the completion of the ECOFIT project several new initiatives are being conducted to achieve the Feldbach region's goal for sustainable development.

These initiatives address restructuring the regional economy and developing new social arrangements necessary for a successful transition towards sustainable development. These projects are run independently

but there is close co-operation between the organizations to achieve the goal of regional sustainable development.

For more information contact:

Michael Narodoslawsky
Institut für Verfahrenstechnik
Inffeldgasse 25
A.8010 Graz
Austria, Europe
e-mail: naro@glvt.tu-graz.ac.at

The Feldbach Region

Feldbach is a region with about 65,000 inhabitants, spread over an area of 730 km². Politically it is an Austrian 'Bezirk', or county. Bezirk administrations in Austria are appointed by the democratically elected government of the Federal State. In the case of Feldbach, the regional administration is appointed by the State of Styria. The local administration is responsible for decisions on infrastructure, construction, and about industrial and agricultural development. There are also regional branches of major institutions and organizations like the chambers of commerce, agriculture and labour.

The Feldbach region is bordered by Slovenia, formerly the Federal State of Yugoslavia, and is only a few kilometres away from the Hungarian border. Hence there are traditionally close international contacts between the Feldbach region and the emerging democracies of Central Europe.

Geographically the Feldbach region is perched between the Alps and the Hungarian Plains, in a hilly landscape that is dominated by the valley of the river Raab. Within the region the topography varies in altitude between 310m in the river valley up to 600m in the foothills. Intensive agriculture, featuring pork production, corn fields and apple orchards, dominates the region.

Farms operating in the region are small, averaging only 8 ha in area. Similarly, industries are numerous but small. The regional industrial base is concentrated in food processing, sand and gravel surface mining, construction material manufacturing and wood processing sectors. The Feldbach region has one of Austria's highest concentration of carpenters.

Statistical information used in the ECOFIT project was obtained from the Austrian National Statistical Bureau. In some cases additional data was obtained from the regional chambers of commerce and agriculture

agencies. There was a concern about the adequacy of data for inter-regional commerce and the state of the environment sectors. However, enough information was obtained to complete the assessment.

The Principle of Adequate Scope

This principle addresses time and space issues. Sustainable development implies consideration of two inherently different time frames: the time frame for environmental processes, and, the time frame of human actions.

The time frame for environmental and ecological processes can range from minutes to millennium. Sufficient discharges of toxins in air, land and water, or habitat destruction, may have immediate short or long term consequences on ecosystems. Accumulations of pollutants in the environment, for example greenhouse gas emissions, have ecological implications which may not manifest themselves, or be fully understood, for several decades or centuries.

Comparatively, human actions and decisions occur within very short time frames. Decisions about implementing technologies are made on the base of return on investment within a short time frame of a few years. Political decisions are governed by the rhythm of elections that usually are repeated every four to six years. Although the time frame for these decisions is very short, their implications are not. Even on the purely human level, decisions have a much longer persistency than just the four year frame of political and economic decisions. An industrial installation that was decided upon within a time frame of four years does not go away after four years. The industrial activity stays until its useful life expires, 20 years or more into the future. Roads, once built out of political calculus in a time frame of four years between elections, may remain on the landscape in perpetuity. The point is that the time scales between decision-making and the results from decisions are significantly different.

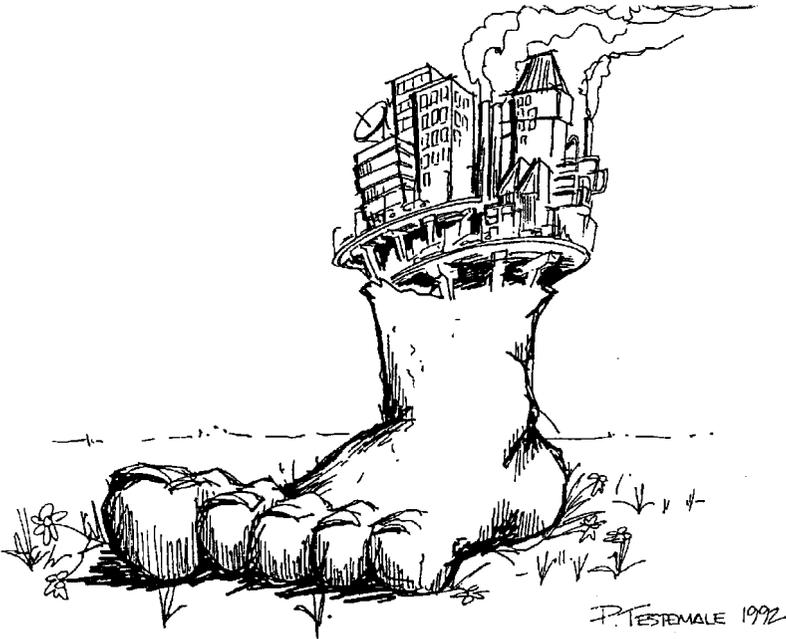
Add to this picture the confusing field of deep changes of ideological political boundary conditions experienced around the Feldbach region. Up to the late 1980's, Feldbach was a remote county perched against an impenetrable iron curtain of Hungary, and to a lesser extent to former Yugoslavia. The fall of the iron curtain induced a boom in commerce. You could tell the Hungarian cars in the streets of the city of Feldbach, because they had all kinds of house appliances tied to their roofs! With the eastern expansion of the European Community occurring within just two decades, the Feldbach region has more opportunities for continued economic benefit. This brief history of Feldbach serves as a reminder on

how short-term human decisions meet with their mid-term destiny. The usual scope for these decisions, the four year rhythm of politics and economics, is void of important information relevant to this decision!

Admittedly, it would have taken extraordinary foresight to predict the fall of the iron curtain and the subsequent development in the Feldbach region. Improved ability to assess outcomes of human activities are all the more important considering the time frame for ecological processes. Implications of human activities on the environment tend to be much longer than even the social implications of our actions. A measure is needed that links social and economic activities to the long term perspectives of the environment.

Within the Feldbach region the ecological footprint (see Figure 1) was used to relate the human and ecological time frames. This tool links the impacts of human activities to the natural setting of the region.

Figure 1: Ecological Footprint: conceptual illustration



Source: Wackernagel *et al.*, 1993. Graph: Testemale, P., Vancouver, Canada.

The ecological footprint is calculated on the base of assimilation of waste streams and the generation of raw materials by natural processes. Thus it is bound to the time frame of the environment. It measures how much environment is consumed by human activities. The footprint links human impacts to the time frame of the environment.

The calculation of the ecological footprint revealed that the Feldbach region is currently consuming 50 per cent more environment than available. This clearly indicates non-sustainable development, but the margin is not as high as in other regions of the industrialized world. Actually, it is less than the Austrian average.

Binding human activities to the time frame of ecological processes reveals the scope of work required to achieve sustainable development. In the Feldbach region there is optimism for implementing major changes for the region to become sustainable. There are possibilities to get human actions in line with processes in ecological time frames. But action must be quick and decisive!

The use of indicator systems based on environmental time scales helps to put decisions and trends in a better perspective. Widening the scope and adapting human activities to environmental time frames and natural processes provides the public and private sector insights to steer a regional transition towards sustainable development.

In the Feldbach case this broadening of the time scope facilitated some crucial conclusions:

- At the moment, the region is out of step with its natural environment.
- The distance to sustainable levels is relatively small compared with the national average and the average of other industrialized regions in the world. Feldbach may well be a forerunner in the transition toward sustainable development.
- The overall structure of human activities is adaptable to sustainable development.
- Given its geographic situation, the Feldbach region is a role model for the emerging Central European democracies to also make a transition to sustainable development and it is prudent for them to investigate this opportunity.

The broadening of the time scope of evaluation to the time frame of ecological processes is beneficial in two areas:

- It allows a clearer picture of where the region stands and therefore facilitates the emergence of a vision for the region (see also Assessment Principle #1: guiding vision and goals).
- It makes decisions less dependent on short-term economical and political pressures and also less contingent on short-term societal impacts (like the fall of the iron curtain).

There are cautions about uncertainty attached to broadening the time scope. These are:

- There is little if any way to look into the future of socio-economic developments. In 1988 in the Feldbach region, nobody envisioned the fall of the iron-curtain and hence the chances emerging from that event. This uncertainty may be lessened by increasing not only the time scope into the future but taking into account the history of a region. Over centuries, the Feldbach Region had acted as a link rather than a border. Considering the regional historical context when stating the vision for sustainable development will help describe future economic and social progress.
- Linking human actions to ecological processes is not straight forward, since many of those processes are not well understood. Care must be taken when expanding the scope of time to the rhythm of the environment that the right indicators are chosen. Indicators used in this context must reflect environmental time frames as the ecological footprint (and related indicators like the Sustainable Process Index) do. In this respect, assessments must carefully consider the premises and background of how well indicators describe human impact on the environment.

Adequate scope also requires assessments to consider spatial dimensions. No region is an isolated system. There is always exchange between a region and 'the rest of the world' in terms of trade, travel, culture. Exchanges also occur in terms of raw material and energy flows and pollution across regional borders.

For example, in the Feldbach region there is a large leather tannery that tans hides imported from the Balkan and Arabic countries for use in European car manufacturing located mostly in Germany, Italy and France. As another example, the agricultural sector produces goods that will be sold in Graz, a city of 250,000 inhabitants, 40 km to the West, or Vienna, the capital of Austria, a city of 2 million people, 180 km to the

North, or in other European markets as far away as Copenhagen, Paris or Barcelona.

There are important differences between agricultural production and consumption. Compared to local consumption, pork is overproduced by a factor of 7.5, as is poultry. Eggs are overproduced by a factor of 8. On the other hand there is underproduction of beef: only 50 per cent of local consumption is produced in the Feldbach region. The same holds true for vegetables with 60 per cent of local consumption covered by local production. Pork from Feldbach mainly goes to Graz and Vienna, poultry may find its way to tables as far away as Copenhagen and Barcelona. Conversely, tomatoes from Holland, salad from Italy and potatoes from Upper Austria are marketed in the Feldbach region. Soy beans from the US or from third world countries feed pigs in Feldbach, whose manure will be used to fertilize local farm fields and which may impact regional surface and ground water quality.

These examples of spatial relationships illustrate that ecosystem changes are not confined to socio-political regional boundaries. All regional human activities must be assessed within a broader geographical setting, transcending regional and national borders.

Regional sustainable development does not embrace creating an “Eco-Disneyland”, where everything appears to be in temporal and spatial harmony within the regional environment at the cost of environmental degradation elsewhere. Sustainable development implies a code of responsibility. In order to maintain sustainable relationships with external jurisdictions, it is important to identify the region’s broader spatial scope and select appropriate sustainability indicators.

The brief description of the spatial context of activities in the Feldbach region showed that every activity has somewhat a ‘region of its own’. Raising pigs involves the soy bean fields located in the US as well as the fields and the groundwater located in Feldbach. Leather tanning has a ‘region’, stretching from Saudi Arabia to the car plants of Germany and France. In order to come up with operational solutions to the spatial scope of indicators, priorities need to be defined. However, there might be more than one ‘space’ for which indicators need to be defined, depending on the prevalent activities in a certain region.

The agriculture sector in Feldbach is investigated further as an example illustrating how to set the scope for sustainable development and also to show what further insights can be gained. As Feldbach is an agricultural region it will always have the responsibility to feed urban areas.

Table 1: comparison of acreage between Austria and the Feldbach region under sustainable conditions

	Austria	m ² /person	Feldbach sustainable region	m ² /person
Inhabitants	7,783.000	10.773	65.700	10.952
Agricultural acreage (ha)	3,500.298	4.497	40.760	6.204
Fields (ha)	1,406.394	1.807	23.407	3.562
Grassland (ha)	1,992.765	2.560	14.346	2.184
Orchards (ha)	21.202	27	2.191	333

Setting the scope to Austria (see Table 1) one can see that in the Feldbach region there is an oversupply of fields of almost 50 per cent (calculated on a per capita base).¹ This means, that under a sustainable scenario, half of the products from fields (which also includes pork and poultry as secondary products) will be produced for consumption outside the region.

Although this does not seem a very spectacular fact, it has important implications for the future of agriculture, a main sector of the regional economy in Feldbach:

- To reach sustainable levels the pork production has to drop by 75 per cent, poultry production by 80 per cent. This means the overall structure of regional agricultural production has to change dramatically.
- Achieving sustainable production levels for these main agricultural products is only possible if there are other sources of income for farmers.
- The market for products changes dramatically. Currently large retail chains are the main customers of agriculture products originating in the Feldbach region. Under a sustainable scenario, taking into account the responsibility of the region for nutrition of the whole nation, 50 per cent of agricultural goods will be consumed locally. This necessitates a completely new structure of marketing, with a heavy emphasis on direct marketing from farmers to consumers. This will also recover part of the loss in income for farmers as they take over new services.

As can be seen from this short example, the right spatial scope for indicators is especially important to set the strategies for the transition toward sustainable development. An incorrect spatial scope can lead to unus-

tainable relations to the outside world, if a region does not accept its due responsibilities or if it overexploits its resources.

An international spatial scope provides another context for assessing the restructuring of Feldbach's agricultural sector. Whereas the national aspect is sufficient to define the responsibility for nurturing urban centres it is certainly too small when it comes to the impact on other agricultural societies and their ability to feed their people.

Pig breeding illustrates spatial linkages with other parts of the world. The high intensity of pig breeding in Feldbach can only be sustained by imports of protein fodder (mostly in the form of soy beans). This means that a substantial part of the acreage necessary to raise the pigs in Feldbach is in fact obtained from foreign countries, partly from regions where malnutrition is a problem. The Feldbach region is experiencing impaired groundwater quality originating from an overproduction of manure that results in high levels of nitrates in the groundwater. In short: the pigs in Feldbach feed in Brazil and defecate in Feldbach, disrupting the nitrogen cycle on two continents.

Examining the global spatial scope reveals that an environmental problem in Feldbach (high nitrate concentration in the ground water) is an economic, social and health problem in third world countries. In these countries, large agricultural areas are blocked by cash crops for export and issues of economic equity and poverty, nutrition, and health are of concern.

In view of this spatial scope, paring down the pork production in Feldbach to environmentally sustainable levels and basing it on regional protein supply reduces local environmental issues and global equity and nutrition issues. The signals coming from the national and global scope for the Feldbach region are pointing in the same direction:

- a decrease of pork production will add to a higher quality of the environment;
- an increase in the quality of agricultural services by offering a broader range of products (more beef and vegetables for regional consumption); and
- a switch to more service orientated activities in the agricultural sectors (like direct marketing of farm products and customizing of products) will keep farm income at reasonable levels to ensure that the agricultural level stays viable.

Connecting with the Bellagio Principles for Assessment

The principle of adequate scope is not only an end in itself but is a necessary precondition to fulfilling other Assessment Principles. The consideration of ecological conditions on which life depends is not possible, if we do not use the right time scope that links human actions to the rhythm of nature's processes.

It is important to use indicators connecting human induced pressures to ecological time frames like the ecological footprint or related indices in order to correctly assess impacts of human actions on the environment. These outcomes will assess the ecological situation of a region and help identify the necessities for making the transition toward sustainable development.

As a region incorporates activities that pertain to very different geographical scopes, the borders of a region are always arbitrary for some, if not most, processes going on in that region. Setting the spatial scope correctly therefore requires priorities to be set. The right spatial scope, however, is a necessary basis for getting the right vision for a region (see Assessment Principle 1) as well as using the holistic perspective called for in Principle 2, and consider equity issues as prescribed by Assessment Principle 3 'Essential Elements'.

Reference

- 1 The slight undersupply in grassland can be compensated for by a higher productivity of the grassland in Feldbach compared to the average Austrian grassland.

Assessment Principle #5: Practical Focus

Assessment of progress toward sustainable development should be based on:

- *an explicit set of categories or an organizing framework that links vision and goals to indicators and assessment criteria*
- *a limited number of key issues for analysis*
- *a limited number of indicators or indicator combinations to provide a clear signal of progress*
- *standardizing measurement wherever possible to permit comparison*
- *comparing indicator values to targets, reference values, ranges, thresholds, or directions of trends, as appropriate*

Sustainable Development Indicators: Monitoring and Assessment at Ontario Hydro

Takis Plagiannakos and Mark Skuce

Summary: In 1993, Ontario Hydro developed a Sustainable Development Indicators (SDI) framework which is used to report publicly Ontario Hydro's progress toward sustainable development. The SDI work contributed to the Corporate Performance (CP) framework, that was developed to drive behaviours and measure progress towards key corporate strategic goals including sustainable development. A subset of the indicators that are included in the CP framework is linked to senior management compensation.

Ontario Hydro is planning to integrate further the measurements of sustainable development into the CP framework through the use of two composite performance indicators: resource use efficiency and, environmental performance. Information about Ontario Hydro's environmental and sustainable development performance can be obtained through its annual progress report towards sustainable development, or by accessing its on-line Web site.

For more information contact:

Takis Plagiannakos
Senior Corporate Planner
Tel: (416) 592-3692
Fax: (416) 592-3205
e-mail: takis.plagiannakos@hydro.on.ca

Mark Skuce
Corporate Planner
Tel: (416) 592-3915
Fax: (416) 592-7097
e-mail: mark.skuce@hydro.on.ca

Corporate Strategies
Ontario Hydro
700 University Ave.
Toronto, Ontario, Canada M5G 1X6
Web site: <http://ohweb.hydro.on.ca/>

Ontario Hydro

Ontario Hydro, serving the Province of Ontario, Canada, is one of the largest electric utilities in North America in terms of installed generating capacity. Total in-service system capacity is approximately 29,000 megawatts, transmitted across 29,000 kilometres of transmission lines and 109,000 kilometres of distribution lines. Its customers include 306



Ontario Hydro - hydro electric station

municipal electric utilities, which in turn, serve more than 2,800,000 customers, and Ontario Hydro Retail which serves almost 1,000,000 retail customers, including 103 large industrial customers.

Ontario Hydro owns and operates 69 hydroelectric stations, five nuclear stations and six fossil fuelled stations. Ontario Hydro's electricity generation in 1996 was 55 per cent nuclear, 26 per cent hydroelectric, 13 per cent fossil and 6 per cent other. Total revenue in 1996 was \$8.9 billion on an asset base of \$40 billion. The company currently employs approximately 21,000 people.

Ontario Hydro, currently a public utility, is preparing for the transition from a monopoly situation to a more competitive environment and in October 1996, a new corporate structure was announced. The new structure is based on a holding company model comprised of three "signature" businesses: a generation company (comprised of nuclear, fossil and hydroelectric business units); a transmission company; and, a retail sales, distribution and services company. The three companies are supplemented by a small corporate centre and a corporate business development group. Ontario Hydro believes that this corporate structure will enable it to successfully compete in a more competitive environment.

The Evolution of Sustainable Energy Development at Ontario Hydro

In the Spring of 1993, at the direction of then Chairman Maurice Strong, Ontario Hydro formed an internal Task Force on Sustainable Energy Development. Its mandate was to design and recommend a strategy for sustainable energy development for the organization. In the Fall of 1993, Hydro's Board of Directors accepted a 10-point strategy set forth in the "Strategy for Sustainable Energy Development and Use for Ontario Hydro" Task Force report. One of the themes of the strategy was that while sustainable development can be viewed as a set of operational principles to guide decision-making, there is also value in considering sustainable development as a context for decision-making. A key recommendation of the strategy called for the development and use of a Sustainable Development Indicator (SDI) monitoring and reporting framework. The purpose of the SDI framework was to measure Hydro's annual progress in attaining its mission which is:

"To make Ontario Hydro a leader in energy efficiency and sustainable development, and to provide its customers with safe and reliable energy at competitive prices".

In 1994, the 10-point Task Force strategy was consolidated into the following five elements of sustainable energy development:

- promoting energy and resource use efficiency
- environmental integrity
- increasing use of renewable energy
- financial integrity
- social integrity

In March 1995, Ontario Hydro's Sustainable Energy Development Policy and Principles were approved by senior management and then the Board and committed the Corporation to:

“Apply the principles of sustainable development throughout its businesses. Ontario Hydro will increase its competitiveness and promote a more sustainable energy future by focusing, initially, on the efficient use of resources, continuous improvement in environmental performance, and diversification of its energy services and products.”

The principles, which provide a framework for decisions and actions that may be undertaken in support of the five Sustainable Energy Development (SED) elements, address areas such as eco-efficiency, working in partnerships, applying the precautionary principle, and monitoring and reporting.

In order to track specific corporate and business unit performance in these areas, Ontario Hydro developed an SDI framework for monitoring and reporting on a set of 27 indicators. This established an analytical basis for technically assessing performance against a comprehensive set of internal benchmarks. For comparison, Ontario Hydro began to monitor a number of external utility and other organizations pursuing sustainable development. The SDIs and monitoring / reporting process are discussed more fully in the next section.

Ontario Hydro's *Sustainable Development Report for 1995* marked the transition from annual environmental performance reporting to an annual report on its progress towards sustainable development. SDIs were used as the standard against which performance is gauged. Indeed, the latest report, entitled *1996 Performance Report—Progress Towards Sustainability*, continues and reinforces this commitment.

Focusing Efforts: Measuring Progress toward Sustainability

One of the more challenging aspects of pursuing a commitment to a sustainable future is devising a means of measuring progress towards that goal. Ontario Hydro has identified five areas and several indicators to meet this challenge.

A number of criteria were considered in evaluating and selecting potential indicators of sustainability. Indicators were selected if they were generally recognized as important, understandable, and corporate in nature. Indicators also needed to reflect corporate strategy, policy and programs, have available data, or data that could be obtained at reasonable cost, and promote a stronger linkage between environment and business. The five areas and selected indicators are described below.

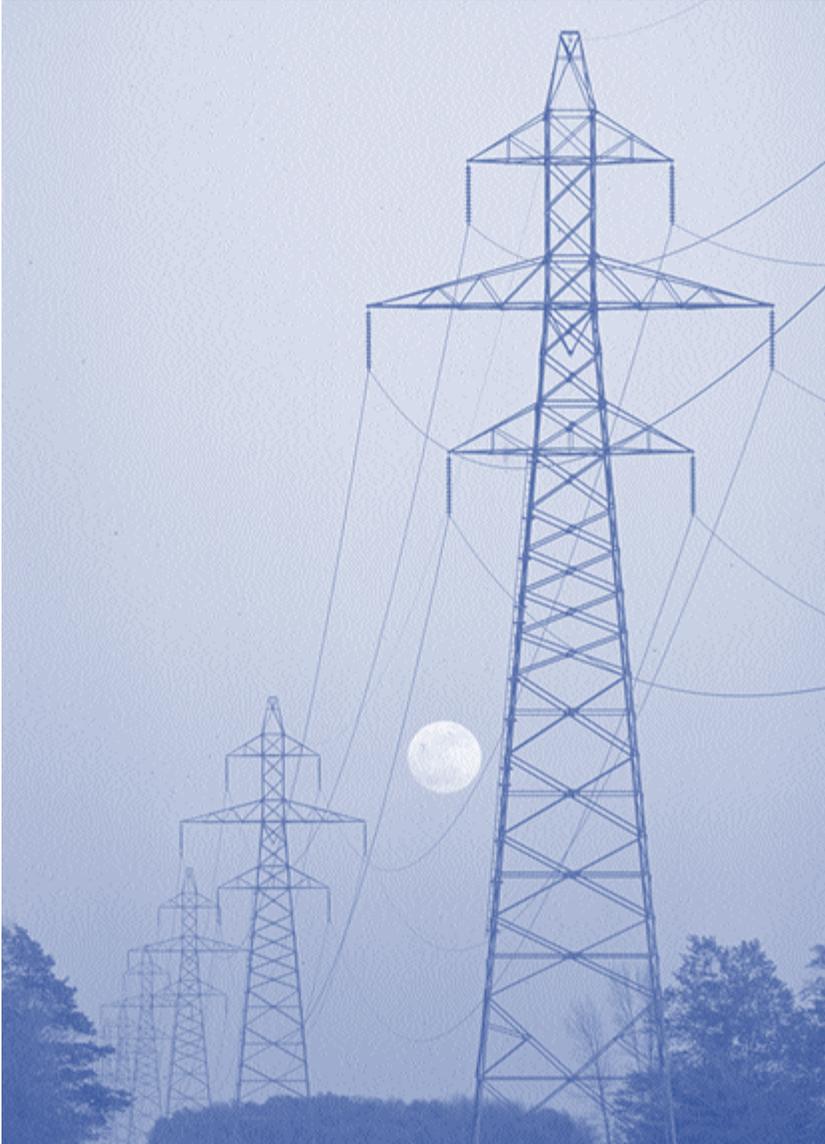
Energy and Resource Use Efficiency: Efficiency, as a concept of thermodynamics, is defined as “outputs over inputs”. Increasing efficiency in terms of energy and resource use allows for improved financial and environmental performance simultaneously. Increased efficiency equates to both improved competitiveness and to an enhanced ability to meet economic, environmental and social objectives. Ontario Hydro’s indicators for this area are:

- total electricity used and transmission losses as a percentage of sales
- fuel conversion efficiency
- water withdrawals
- fuels and other commodities consumed
- internal energy savings

Environmental Integrity: Operations should not adversely impact the receiving media of local, regional or global ecosystems. A starting point is to measure and reduce, where feasible, the rate of emissions that result from activities related to design, development, operation, and decommissioning of facilities as well as from procurement and material management. Environmental integrity is improved by reducing the wastes, effluents and emissions resulting from operations. The indicators Ontario Hydro developed for this area are:

- greenhouse gas emissions
- waste management
- ozone-depleting substance emissions
- levels of radioactive waste produced

- acid gas releases
- compliance violations
- hazardous wastes
- reportable spills
- environmental expenditures



Hi-voltage electric transmission corridor

Renewable Energy: This area measures the use of, and priority given to, renewable energy. The provincial (and global) economy currently relies on many non-renewable and non-indigenous energy forms. Increasing the capacity to meet its energy needs through renewable, indigenous energy sources offers the potential to enhance the stability and security of energy



Advanced renewable energy technology

supply in Ontario while reducing the capital outflow. Ontario Hydro's indicators in this area are:

- energy generated from renewable sources
- energy generated from advanced renewable energy technologies (e.g. wind, solar)

Financial Integrity: Financial integrity is determined by Ontario Hydro's ability to consistently generate positive cash flows from its asset base and to strengthen its equity position over time. Positive cash flows allow the organization to make ongoing investments in upgrading its capital and human resources thereby enhancing its competitiveness. Indicators which are typically reported in its corporate annual reports are:

- net income
- interest coverage
- debt ratio
- total unit energy cost

Social Integrity: Social integrity is determined in part by the best utilization of Ontario Hydro's human resources and by interactions with the communities it serves. To successfully respond to changing market and ecological conditions, Ontario Hydro will need to foster a work environment that encourages innovation, experimentation and greater employee involvement. Ontario Hydro's indicators in this area are:

- employee accident severity
- corporate citizenship program
- employee productivity
- payments in lieu of taxes
- number of public fatalities
- aboriginal grievances
- number and severity of environmental complaints

This detailed approach to measurement and reporting has helped integrate environmental, economic and social dimensions into the decision-making process. By implementing this framework, along with an ongoing process of benchmarking, the company has been able to ensure that its performance objectives continue to be relevant and challenging. This approach is consistent with Ontario Hydro's commitment to continual improvement and leadership in sustainable development.

Hydro has decided that the SDI framework will continue to form the basis for assessing and reporting publicly on corporate and business unit SED performance. On an annual basis, Hydro will monitor and report the performance of a subset of those SDIs as part of the Corporate Performance framework which is discussed in the next section. A subset of the sustainable development indicators is used in the framework to drive performance in those areas that are important from a corporate perspective.

Ontario Hydro's Corporate Performance Framework

Ontario Hydro has had a Corporate Performance (CP) framework in place for a number of years. The CP framework has the following objectives:

- align the Corporation and its Business Units to the Corporate Mission and long-term strategic objectives;
- measure how successfully the mission is being accomplished;
- drive behaviours and achieve performance levels, balancing short and long-term strategic objectives;
- tie specific performance measures to compensation;
- improve the integration of the performance targets into the Business Plans;
- reflect matters of corporate significance; and
- be amenable to benchmarking and independent auditing.

The CP framework is composed of a set of financial and non-financial indicators that are considered to be key drivers of behaviours or performance. It is designed not only to track past performance in specific Key Results Areas (KRAs) but to change behaviours and initiate actions to meet short-term as well as long-term strategic objectives and targets. A sub-set of the indicators included in the CP framework is linked to senior management compensation.

Table 1 shows the five KRAs and the indicators used to establish targets and track performance in 1997. Each KRA focuses on certain goals and has its own performance indicators:

Table 1: Key Results Areas: Goals and Performance Indicators

Customer Focus	
Goal:	Keep electricity bills as low as possible while providing reliable energy services that meet customers needs
Indicators:	Customer Satisfaction Index, Average Electricity Price Change, Customer Delivery Interruptions
Stewardship	
Goal:	Use energy and natural resources efficiently Continuously improve environmental performance to ensure the long-term sustainability of Ontario's economy and environment
Indicators:	Spills Volume Lost to the Environment, Carbon Intensity Rate, Annual Internal Energy Savings, Nuclear Special Safety System Performance, Nuclear Reactor Trips
Employee Focus	
Goal:	Develop and maintain a skilled, motivated and safety conscious workforce Make full use of intellectual resources
Indicators:	Accident Severity Rate
Financial Viability	
Goal:	Be financially sustainable and sound Ensure long-term viability
Indicators:	Net Income, Amount of Debt Reduction
Competitiveness	
Goal:	Prepare Ontario Hydro for a more competitive electricity marketplace Enhance quality of products and services
Indicators:	Customer Retention/Economic Development, Labour Productivity, Total Unit Energy Cost of Electricity

Incorporating SED into the Corporate Performance Framework

In 1996, the annual review process revealed that three of the major SED areas — Environmental Integrity, Resource Use Efficiency and Renewable Energy — were not well represented in the CP framework. In order to address this problem, Ontario Hydro reviewed the indicators included in the SDI framework and opted to further focus its measurement and assessment process. Two composite indicators were designed: namely, a Resource Use Efficiency composite indicator to focus on “inputs” (i.e., fuel, water, energy material etc.) and an Environmental Performance composite indicator to focus on “outputs” (i.e., emissions,

effluents and wastes). The two indicators are currently being developed with the participation of all the Business Units.

Resource Use Efficiency Composite Indicator

The need to focus on Resource Use Efficiency has been supported by the following developments over the last few years:

- The focus on improving resource utilization is driven by Ontario Hydro's mission statement "...to become a leader in energy efficiency and sustainable development...";
- One of the four objectives of the 1995 Corporate Integrated Resource Planning Process, undertaken to provide guidance for investment decisions, was "to improve environmental performance and make more efficient use of resources";
- Business Units have identified resource utilization as an important strategic area and they are working towards developing plans to improve efficiency;
- Resource utilization efficiency is consistent with the concept of "eco-efficiency" which challenges businesses to produce more useful goods and services while using resources more efficiently and reducing environmental impacts.

Long-term targets have been set for the indicators in consultation with the Business Units. The Resource Use Efficiency composite indicator and its associated targets are expected to drive the following behaviours:

- reduce resources used in the production and delivery of electricity and other areas of Ontario Hydro business;
- reduce production and material management costs;
- reduce waste and associated costs; and
- encourage development of new business opportunities.

Environmental Performance Composite Indicator

Ontario Hydro's SED approach acknowledges that meeting environmental regulations as a minimum requirement, and encourages the organization to look for environment-business advantages. The company's strategy is to:

- look for pollution prevention opportunities rather than end-of-pipe solutions which are often more costly;

- pursue voluntary actions and take initiatives to meet emission/effluent standards in order to manage the costs, process changes, and time frames more effectively; and,
- consider market-based mechanisms, like emission reduction trading programs which generally give the business more flexibility in achieving government-established emission standards in a more cost-effective manner.

Adopting aggressive targets for the environmental composite indicator and its components are expected to drive behaviours to:

- reduce releases to the local, regional and global environment;
- minimize waste and increase re-use and recycling;
- improve nuclear safety; and
- reduce community impacts.

Key Characteristics of the Composite Indicators

The composite indicators under development reflect the following characteristics:

- they include well-defined performance indicators;
- they assess performance relative to long-term targets;
- they use a simple and transparent performance scoring methodology;
- the performance indicators are appropriately weighted; and
- the results are calculated and plotted.

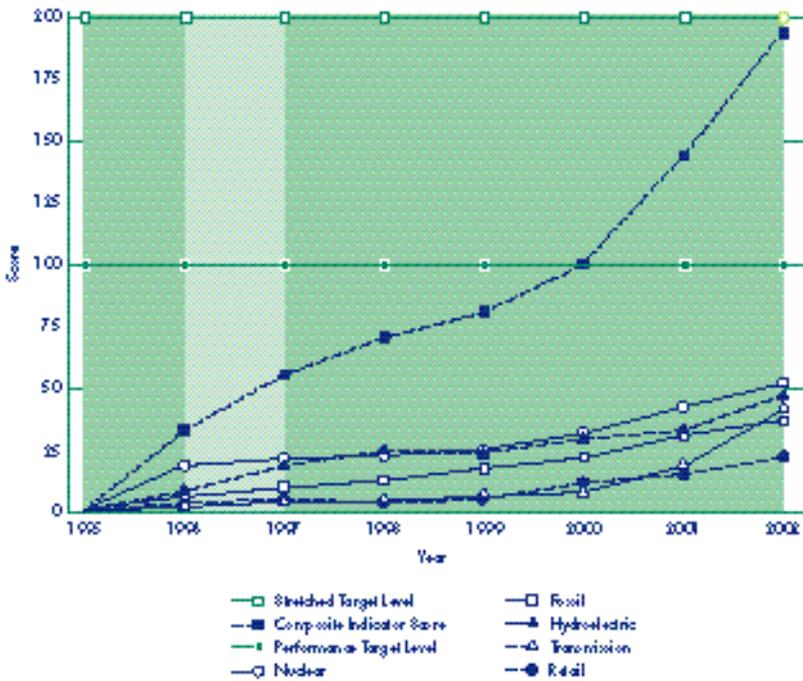
Figure 1 illustrates how different sub-components could contribute to the overall performance of the composite indicator. Figure 2 illustrates how each Business Unit could contribute to the overall performance of the composite indicator.

Uses of the Composite Indicators

It is expected that the composite indicators in particular will be used to:

- *assess progress towards sustainable development*: The composite indicators focus on three SED areas (Environmental Integrity, Resource Use Efficiency and Renewable Energy). As a result, they provide a useful measurement of the overall progress that Ontario Hydro is making toward sustainable development.

Figure 1: Contributions to the Environmental Performance Composite Indicator by Business Unit

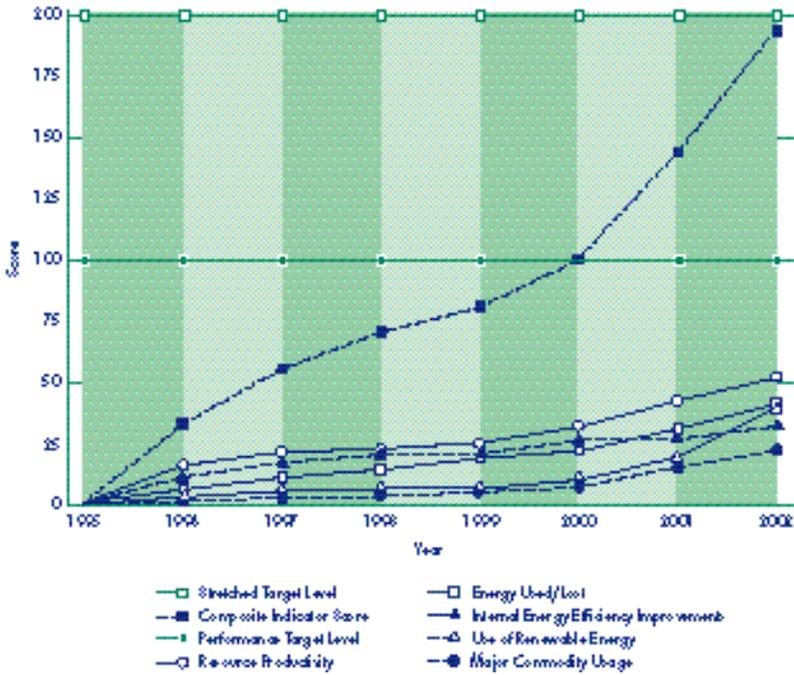


Notes:

1. “Performance Target Level” is that level which is consistent with the corporate strategic objectives but is constrained by the resources dictated by the business planning process.
2. “Stretched Target Level” is that level that is consistent with the corporate strategic objectives but is not resource constrained and is based on external benchmarking information or other factors.
3. The data in the Figure are illustrative and do not reflect actual or planned performance.

- *report progress towards long-term corporate targets:* The scores of the composite indicators will measure the Corporate and Business Unit performance relative to their long-term targets. For example, a score of 35 per cent for either the Environmental Performance Indicator or the Resource Use Efficiency Indicator means that the Corporation has achieved 35 per cent of its long-term performance targets in that area.

Figure 2: Sub-components of the Resource Use Efficiency Composite Indicator



Notes:

1. “Performance Target Level” is that level which is consistent with the corporate strategic objectives but is constrained by the resources dictated by the business planning process.
 2. “Stretched Target Level” is that level that is consistent with the corporate strategic objectives but is not resource constrained and is based on external benchmarking information or other factors.
 3. The data in the Figure are illustrative and do not reflect actual or planned performance.
- *facilitate effective communication:* Ontario Hydro’s annual sustainable development report is comprehensive and reports on a large number of indicators. The two composite indicators combine a number of indicators, using a consistent and transparent calculation framework, in order to illustrate if real progress is being made. By design, the composite indicators will also identify areas where performance needs improvement.

- *management performance:* The two composite indicators provide information for management to assess progress towards short-term and long-term SED strategic objectives and targets. They also report progress relative to the baseline and indicate the contribution of each Business Unit to overall performance (see Figures 1 and 2). The two composite indicators can be used as a management tool to drive performance in specific areas, can be included into the CP framework and can, if desired, be linked to the compensation program.

Communicating Results

Environmental performance results are regularly reviewed by senior management and are reported quarterly to the Environment & Public Policy Committee of Ontario Hydro's Board of Directors. Other stakeholders, including government and environmental non-government organizations, either receive regular reports, are participants in meetings/discussions, or obtain information about Ontario Hydro's environmental and sustainable development performance through its on-line Web site.

Lessons Learned

- Measuring progress towards sustainability requires a number of different techniques. In this respect, sustainable development indicators have been beneficial to Ontario Hydro in that they have drawn in a range of factors, not just the environmental ones which Hydro had traditionally used.
- Composite indicators are an advantageous method of focusing assessment and measuring, as well as communicating overall corporate performance. Composite indicators are expected to significantly enhance Hydro's ability to report progress toward sustainability.
- Composite indicators, in conjunction with the measures and targets that comprise them, can be used as an effective management tool to drive behaviours and improve performance. To be effective, they should be tied to compensation.
- At Ontario Hydro, SED has significantly contributed to improving effectiveness and competitiveness. In addition, the identification and quantification of performance indicators has yielded a positive benefit in terms of public accountability.

Assessment Principle #6: Openness

Assessment of progress toward sustainable development should:

- *make the methods and data that are used accessible to all*
- *make explicit all judgements, assumptions and uncertainties in data and interpretations*

The European Pressure Indices Project

Jochen Jesinghaus

Summary: Identifying and selecting a core set of environmental indicators for the European Union is underway. This case study illustrates an example where judgements, assumptions, uncertainties in information and interpretations, and broad accessibility to data and methods occurred. Managing the selection of indicators across several jurisdictions presented unique challenges for consensus and collaboration.

The results from this project will describe human activities impacting the environment. A Pressure-State-Response model guides the definition and selection of indicators. Close attention is given to the ability and extent participating states can provide physical data. The selection of indicators for urban noise and odour issues are highlighted in this illustration.

The underlying working rules for this project are transparency, inclusion of relevant stakeholders and consistent methods. These principles are demonstrated by the creation of expert groups, engaging policy makers, and making choices through questionnaire surveys. These open processes advance the European Union's capacity to assess progress toward sustainable development.

For more information contact:

Jochen Jesinghaus
JMO C4/007
L-2920 Luxembourg
European Commission
DG 34/F3
Tel: (+352) 4301-37278
Fax: (+352) 4301-37316
e-mail: jochen.jesinghause@eurostat.cec.be

Context and History

The European Union was formed in 1957 with the Treaty of Rome. Today it comprises 15 member states including Austria, Belgium, Denmark, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom in a programme aimed at monetary union, citizenship and common internal, foreign and security policies. Its organizational structure includes the Council of the European Union, the European Parliament, the European Commission, the European Court of Justice, the European Court of Auditors and the Economic and Social Committee. Twenty commissioners form the European Commission and represent the community interests. The European Commission has a civil service of 26 General Directorates,¹ one of which is Eurostat, the Statistical Office of the European Communities. Each department is responsible for implementing common policies and administration in specific areas, such as sustainable development.

In 1992, responding to the challenges outlined in the *Brundtland Report*, a group of European Commission officials met to assess options for providing environmental policy with a tool that would fulfill roughly the functions that the well established System of National Accounts (SNA) has for economic policy. “Green GDP” and “indicators” were the catchwords to start with. The group, consisting of environmental experts working in the General Directorates of the Commission, such as: environment, agriculture, energy, transport, economic instruments, research etc., quickly embarked on lively discussions on the “right” way to value environmental damages required for an “Environmentally adjusted Domestic Product” (EDP).

The group soon found out that there would not be a quick consensus on a common valuation procedure, given the huge differences in basic attitudes between economic sectors (putting the focus on material wealth and employment) and environmental organizations (stressing long-term aspects and global distribution issues subsumed under the “Sustainable Development” label). Although the option to substitute conventional GDP with a “greened” version was not totally excluded, there was a general feeling that this was a long-term consideration only. The vision of having statisticians decide whether environmental problems account for 1, 5 or 20 per cent of GDP was simply not considered appropriate, given the enormous differences in monetary valuation techniques even in well-studied fields such as Climate Change.² Furthermore, it was quite obvious that the physical information base was insufficient. Before estimating the

valuation of damages caused by human activities, the magnitude of these activities, e.g. how much carbon dioxide was emitted in a given year and country, should be documented. While there would be sufficient data for carbon dioxide emissions, it was clear that data for many other environmental pressures was not available. Quality information required for valuing human activities affecting the environment such as the amount and importance of habitat lost, the quantity and quality of groundwater resources used, quantifying the dispersion of toxins, the types and amounts of substances found in waste streams and waste treatment-related environmental impacts, are not available. This contrasts sharply with the data and methods available for monitoring conventional economic activities, such as the annual amounts and values of production by sector, employment, or capital and operational expenditures.

One of the principal problems is the lack of a common understanding of which activities should be included in a “greened” Gross National Product. Should the adjustment focus on “economic” variables, such as forest or groundwater resources, excluding the “intangible” values such as the beauty of a landscape, or the extinction of a species with no apparent market value? Or should all “unwanted activities” be included in such a system, at the expense, however, of endless discussions on how to value a butterfly in monetary units?

There was no easy solution to this dilemma. After intensive discussions, the group finally opted for a two-pronged approach, described in detail in the *Communication from the Commission to the Council and the European Parliament on “Directions for the EU on Environmental Indicators and Green National Accounting” (COM (94) 670 final, 21.12.94)*. They recommended:

- ‘satellite’ accounts alongside the national accounts and closely linked to them, some in physical and some in monetary terms, that will themselves provide a powerful analytical tool and in which the new concepts can be tested;
- calculation of physical indicators and indices related to the pressures of human and economic activities on the environment.

The latter approach, a European System of Environmental Pressure Indices (ESEPI), aims at a detailed physical description of harmful human activities at the aggregation level of “policy fields” such as Climate Change or Waste. Figure 1 shows an example what the final product could look like. (Note that the example is illustrative with regard to the individual indicators, which still have to be determined.)

Figure 1: The European system of environmental pressure indice



The European Parliament discussed the Commission proposal in various committees and endorsed the approach with an overwhelming majority of 411 to 5 votes on October 11, 1995. Since then, more than 30 sub-projects were launched, performing three basic functions:

- identification and definition of the most relevant indicators (see below)

- development of methodologies for calculating these indicators
- data provision and integration with standard economic statistics.

Openness through Surveys

From the very beginning of the European System of Environmental Pressure Indices project, it was clear that only relative valuations could be used. The project would not attempt to assign monetary values to the pressures nor compare them directly to economic performance measured in market prices. Instead the study participants accepted that “we may not agree on the absolute importance of Climate Change, but we could at least determine the relative contribution of various emissions contributing to the problem”. For Climate Change, this is apparently easy, since the Intergovernmental Panel on Climate Change (IPCC) has reached a consensus on the Greenhouse Warming Potentials of the most relevant greenhouse gases. This could also be done for constructing an Ozone Depletion index, for the same reason: the IPCC has agreed on Ozone Depletion Potentials that could be used to weight the various components, mainly chlorofluorocarbons, CFCs, in an overall index.

Quite obviously, most of the 10 policy fields are far away from such a consensus. For the policy fields Loss of Biodiversity or Urban Problems, Noise and Odours, for example, there would not even be a consensus about which of the most relevant pressures to include in an overall index. A complete description of the pressure of human activities on the environment requires the establishment of a set of about 50-100 physical indicators for the 10 policy fields covering the themes of the Fifth Environmental Action Programme. The projects urgently needed “IPCCs” for the other eight policy fields. Starting new IPCC-like consultations with the 15 governments of the EU for eight policy fields would have postponed the finalization of the project well into the next century; a short-cut was necessary.

The best way to “mimic” the IPCC process with a minimum amount of time and resources was to set up panels of experts, and to identify the “mainstream” indicators for each policy field using surveys. This solution was not only feasible, it also offered an important by-product for the project: openness to potential users of indicators and indices.

There are seven steps in this process. Briefly these are:

1. 1993: define the 10 policy fields on the basis of the seven “themes” of the European Union’s Fifth Environmental Action Programme (Resource Depletion and Dissipation of Toxins were added for com-

pletteness, while Climate Change was divided into Climate Change and Ozone Depletion)

2. 1994: Specialized Institutes (SI's) started work on the indicators (one for each policy field, plus one for methodological support).
3. 1995: Scientific Advisory Groups (SAG's) were established. There is one group of between 250 and 300 persons per policy field, representing the 15 member states.
4. 1995: By December an initial questionnaire to identify a proposal list of indicators was designed and distributed among the SAG's.
5. 1996: In October a second survey was distributed, based on the indicators most frequently recommended by the SAG's. This survey obtained the experts' ranking of the indicators according to policy relevance, analytical soundness, and response elasticity criteria, thus facilitating the choice of a 'core set'.
6. 1997: Three workshops were held between January and February at which the survey results and data availability were discussed.
7. 1998: Project completion. Data for 60 indicators will be assembled, published in a handbook and integrated with economic accounts.

Ten Scientific Institutes have had the task of creating Scientific Advisory Groups for each policy field per European Union Member State. Each Scientific Advisory Group includes more than 200 European Union leading researchers and experts. These people are specialized scientists working in universities and other research organizations. They were identified for membership through workshop participation lists, databases of national research councils and other public sources. The Scientific Advisory Groups have been invited to make recommendations through the use of two written questionnaires. The surveys were the tool used to identify draft lists of environmental pressure indicators for each policy field.

The first questionnaire was sent out in December 1995 to over 2300 European experts of which over 600 replied. Each return questionnaire generated an average of four to five indicators. Thus, a total of 2700 indicators were suggested. Even after excluding duplications, the Scientific Institutes still had to deal with more than 1000 extremely wide-ranging indicator proposals. This huge and mixed set of suggested indicators had to be reduced into a smaller set of environmental pressure indicators which could be used as the basis for the second survey which took place in October 1996. The results of this second questionnaire survey provided

succinct core sets of indicators, and hence will be particularly important for future work on data collection and indicator calculation.

Below is an example for “Urban Problems, Noise and Odours”, one of the conceptually most difficult policy fields:

Figure 2: Pressure Indicators “Urban Problems, Noise and Odours”: Policy Relevance

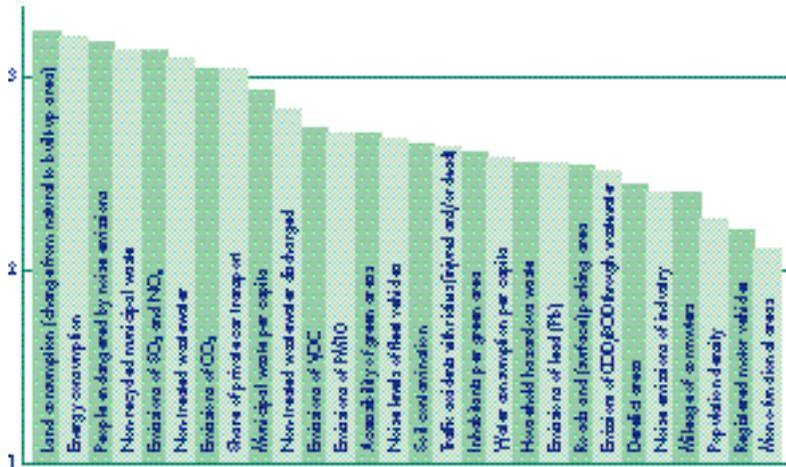


Figure 1 shows the average answers to the question “How important would the pressure indicators presented here be to a national policy maker, e.g., in the environment ministry of your country?”, ranked from 1 (policy relevance very low) to 4 (very high) by 57 European Union experts on urban problems.

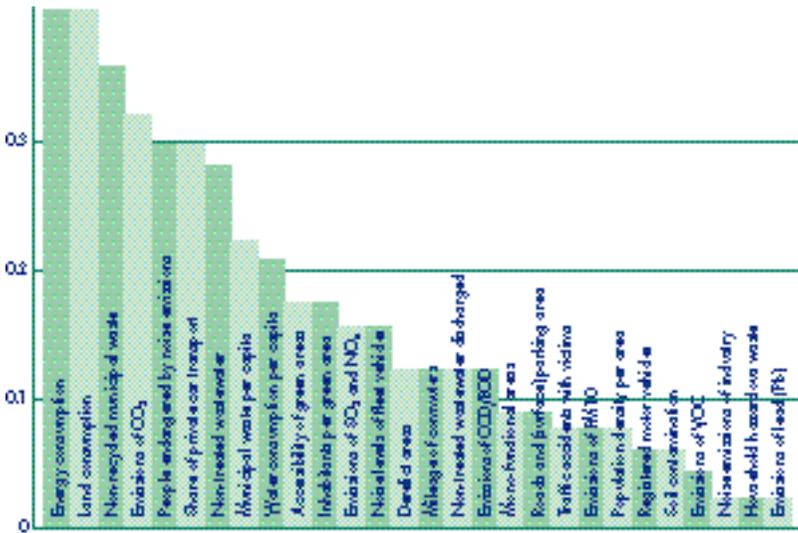
One of the most important results of this survey is that many indicators are needed to give a comprehensive picture. Picking out a few lead indicators, like energy consumption, share of private car transport, or inhabitants per green area, is simply not enough. Since the data base for many of these indicators is weak, and resources to strengthen them are limited, a ‘core set’ of between five and 10 indicators for this policy field will be selected.

It is crucial that potential indicator users agree with and accept the proposed measures for gauging pressures in each policy field. The Openness facilitates a way for engaging the users in the indicator selection process.

About 300 urban policy-makers participated in the two surveys to identify and select this set of indicators. During the course of this process these urban specialists were invited to identify an initial list, and later to select those which were proposed more often. The set of 30 indicators resulting from the second survey represents their set of indicators. The urban policy-makers also understand that for a variety of reasons the whole set of 30 indicators will be reduced again. Their preference determines which are the most essential indicators. The last survey question was, not by accident: “Imagine that you would have to describe the overall pressure in this policy field using a maximum of five absolutely essential indicators from the list presented here; which five would you choose?”

The results to this ‘core indicators’ question are shown below.

Figure 3: Pressure Indicators (Urban Problems, Noise and Odours): Core Indicators



The results from this question generate a practical short list of data requirements. Since the ranking is much steeper than in the previous question, decisions can be made on where to short cut. For example, a decision rule could be made to accept all the indicators which more than 30 per cent of the experts selected to include in their ‘core’ sets, that is, the first four indicators only: energy consumption, land consumption,

non-recycled municipal waste and carbon dioxide emissions. More time and resources would allow for including the 25 per cent level and add the next three indicators to the core set.

The essential advantages of this process is the practical focus, consensus on priorities and flexibility to adapt to available resources. A message to the urban policy experts participating in this policy field was: “We took the indicators you suggested. We are willing to produce them, but we have limited resources. Based on your assessment, we may start this year with the ‘top four’ indicators, and then subsequently add new indicators until the list is complete enough”.

The identification and selection process employed in this example of the European System of Environmental Pressure Indices illustrates the Assessment Principle of Openness.

There was an internal process for European Union members to understand the issues and methodological and data constraints.

The issue was discussed at senior decision making levels and policy makers are aware of the problems and prospects for addressing the concerns.

Expert panels, leading researchers and policy analysts are involved in the listing and selection of indicators.

Realistic limitations on data collection are well understood and included as inputs to the selection process.

Opportunities may occur where the core set can be increased as resources become available.

The inclusive nature encourages agreement between policy makers and data generators.

The most important result of the survey’s rational approach is that the endless discussion about the ideal indicators is ended and important work to produce indicators may begin. The inherent tendency of indicator experts to talk about intellectually stimulating things like the one-and-only scientifically sound framework and the most accurate method to aggregate indicators to indices, while leaving the task of data collection to statisticians, always ignored the basic problem that an index needs several components before it can be constructed. The bottleneck is the database, not the intellectual capacity of indicator experts.

Lessons

Some lessons drawn from this experience:

1. Surveys are an excellent way to demonstrate openness. They have an inherent element of democracy, are relatively cheap, and their results are more transparent, better understandable and more credible to many people than any 100-page methodological study could ever be. They also involve a great number of potential indicator users, thus raising the visibility of the project and making the future user familiar with the results at an early stage.
2. The surveys are transparent and created confidence in the European System of Environmental Pressure Indices project by demonstrating that there is nothing to hide, and that no indicators are being “suppressed for political reasons” (as the opposed parties in the environmental policy process otherwise might suspect). Surveys also helped advertise the philosophy of the indicator system among qualified users, and demonstrate some of the limitations with regard to data availability and resources needed.
3. Openness costs time and effort. A few ‘inner circle’ experts might have come to a much faster, and even, at first sight, technically more convincing solution. However, developing a full set of 50-100 pressure indicators will require the participation of many organizations, and considerable financial and human resources. Openness helps to get the support of these organizations, and it makes sure that the ‘product’ is also accepted by people who did not have a chance to participate directly in the project e.g., through a study contract.
4. There are limits to openness: the more people are involved, and the more details they want to know, the less time remains for doing the legwork. Another limit is the need to protect the right to privacy of the survey participants. Publishing the list of involved experts, for example, would certainly have increased the openness and transparency of the exercise, but it would have been an intrusion into the professional and/or private life of experts which we decided to avoid.
5. Openness is closely linked to the principle of involvement. Especially through surveys, relevant users of indicators as well as potential data providers can be involved by asking them to add their experience to a joint effort. While information on the progress of a project is easy to provide, it is much more difficult to give all potential users an active role in such a project. The small group of 30 sub-projects

involved in the Pressure Indices project already requires immense co-ordination efforts, since people from many countries, with different languages, cultural and professional backgrounds have to be convinced to work for a common product. For the success of the project, a smaller group of people working in a transparent way is better than a large group of people fully “involved” but running around in circles. Involvement should be efficiently organized, e.g., through surveys, workshops or other forms of systematic consultation.

Key Message

Surveys were used to identify and select the most important environmental pressure indicators in an international (mainly European Union) setting. Surveys were the most practical way for making all the judgements, assumptions and uncertainties accessible to the participants in this project. This demonstration of openness in designing pressure indicators will facilitate integrating environmental and economic well-being for assessing progress towards sustainable development.

References

- 1 European Commission General Directorates have approximately the same functions as ministries in governments.
- 2 “Reasonable people find environmental externalities from the production of electricity to be anywhere from 0.01 mils per kilowatt hour to over 100 mils per kilowatt hour, a range four orders of magnitude.” Stephen Wiel (Lawrence Berkley Lab.): *The Science and Art of Valuing Externalities: A Recent History of Electricity Sector Experiences*. DG XII/IEA ExternE Workshop, 26.1.1995.

Assessment Principle #7: Effective Communication

Assessment of progress toward sustainable development should:

- *be designed to address the needs of the audience and set of users*
- *draw from indicators and other tools that are stimulating and serve to engage decision-makers*
- *aim, from the outset, for simplicity in structure and use of clear and plain language*

Community Indicators Resource Pack in the U.K.

Alex MacGillivray

Summary: New types of and new ways for communicating information about progress toward sustainable development need to be developed. Empowering people to devise their own indicators may solve problems of mistrust and alienation about what is happening in society, the economy and the environment. The New Economics Foundation of the United Kingdom proposes a six step model for designing an effective communication-based strategy. Creative ways of presenting indicators are needed and promising techniques are available.

New Economics Foundation and four partner communities are jointly developing a Community Indicators Resource Pack. It will provide information for community groups and organizations interested in communicating and taking action on important issues. The pack will also provide resources in a range from print to electronic media. The resource pack will be available in the Fall of 1997.

For more information contact:

Alex MacGillivray, Co-ordinator
New Economics Foundation
1st Floor, Vine Court
112 Whitechapel Road
London E1 1JE UK
e-mail: neueconomics@gn.apc.org.

We Don't Talk Anymore: Understanding Communication Breakdown

"They only tell us what they want us to know. And that's the end of that, so you're left with a fog in your brain, so you just think — what have I to worry about? I don't know what they're on about".

Focus group participant, Lancashire¹

The big puzzle for politicians and economists in the 1990s is the divorce between mainstream economic indicators and the so-called Feel-Good Factor. "If the economy is up, why is America down?" asked *The Atlantic Monthly* in October 1995. In the UK, the phenomenon has become a cliché, covered in all media, from *Bella* magazine to *The Financial Times*. Britons are told to think themselves lucky with a jobless count of 'only' 8 per cent. The economy is growing, inflation is low, productivity is up... people should be grateful. Think of Spain — there unemployment is 22 per cent.²

The problem is that people ignore these conventional economic indicators. They see instead a new economic context, and don't like what they see. Those in work put in longer hours. Job security is (at least felt to be) a thing of the past. Gloomy predictions are made about an ever-shrinking job market, under the onslaught of new technologies. Jeremy Rifkin and others warn that more and more workers (whether blue, white or striped pink collar) will be chasing fewer and fewer 'real' jobs.

The gulf between how people feel and what they are told reflects a dramatic decline in confidence in national institutions, according to opinion poll research. Yet governments and their agencies are the major source of information on social and environmental trends. The problem is that official statistics tend to be boring, confusing, suspicious, or all three. Sometimes there is good reason for mistrust: in the UK the methodology for calculating unemployment rates has changed 30 times since 1979, for example. In general, initiatives for 'open government' should be welcomed. But all too often, the performance indicators that result, whether on railway punctuality or urban air quality, simply don't match people's everyday experience. Cynicism about this bombardment of official indicators has been confirmed in a recent study by Lancaster University (see box).

Alienating indicators:

In a study commissioned by Lancashire County Council, researchers at Lancaster University held a series of focus groups to investigate public perceptions about sustainability — and the institutions and indicators being used to tackle it. The groups were made up of 8-10 members of the general public: young men on government training schemes; Asian women; mothers; unemployed men; retired people; rural professionals; working class women and young professionals³. The discussions in the focus groups revealed a disturbing degree of cynicism, even fatalism, towards the indicators originating from the country's public institutions:

“Whilst people do in fact use a variety of indicators in their day to day lives (e.g. weather forecasts, body temperature as an indicator of health, exam marks as an indicator of educational progress), it appeared to be difficult for people to reflect on the role of current indicators in their lives. Moreover, the majority of the groups not only considered the idea of indicators an abstract and difficult concept, but more generally were suspicious of official statistics and information. ...The further removed indicators were from peoples’ immediate realities, the less likely they were to find them credible....[M]ost participants not only felt ignorant about wider social and environmental matters, but were also of the opinion that this state of ignorance was perpetuated by institutions carefully and cynically presenting their own biases...”

Source: Macnaghten, P. *et al.*, 1995.⁴

A growing body of work in Europe, North America, and in developing countries shows that the answer to this alienation is to empower people to devise their own indicators, which are common sense and have the trust of the community. As one rural person has put it:

“It comes back to local knowledge. People have said that the beaches are more polluted than what they’ve been for years. I could have told you that. Because I’ve seen from upstairs for 30 years and looked out the window every day and seen the colour of the sand change colour. Whereas it used to be like everyone imagines sand, it’s now a brownny colour”.

Measuring sustainable communities

Given the opportunity, people can and do identify effective indicators and take sustainable quality of life seriously. Indicators are like flags, used to simplify, measure and communicate information, and to rally support for action. An indicator is nothing mysterious; it is simply a way of measuring and making understandable something that is considered important. Hours, minutes and seconds are indicators of passing time. A high temperature is an indicator of sickness. And a leaping salmon is an indicator of clean water. Community indicators arise from a process which can, like in Seattle, take years, but which can also take a fortnight (see box).

Don't tread in it, flag it up

This example comes from the city of Reading. A local park was being ruined by the large amounts of dog mess on the paths and grass. Local people had become concerned about the issue, and the ineffectiveness of controls on dog-owners. One day, red flags were placed over each dog mess in the park by a team of volunteers. There were lots of onlookers. The press was invited to come and see, and took photos of over 900 flags.

This vivid indicator literally “flagged up” the problem and communicated it effectively to the readers of the local papers. When the exercise was repeated a few weeks later, only 250 flags were needed. The indicator was certainly effective in galvanizing action among dog-owners.

Source: *Working in Neighbourhoods: WWF and Local Agenda 21*, 1995

Indicators have been tried at a wide variety of scales, from regions of over two million inhabitants, down to single villages and parishes. Table 1 shows the sheer range of different communities in which sustainability indicators have been developed.

Table 1: Community indicators: types of community and population

Pilot	Type of locality	Population
Longformacus & Cranshaws	village	243
Merkinch, Inverness	district	3,500
Pilton, Edinburgh	housing estate	25,000
Mendip	rural district	95,000
Oldham	metropolitan borough	220,000
Seattle (USA)	city	500,000
Lancashire	county	1,414,000
Strathclyde	region	2,290,000

Source: New Economics Foundation

The processes, people and products have come in all shapes and sizes, but it should come as no surprise that the common element in all successful exercises is the principle of effective communication.

The Medium is the Massage?

No-one these days quite remembers Marshall McLuhan’s point, unless they are doing media studies, but many people are familiar with the ‘Gee-Whiz’ graph immortalized by Darrell Huff in his classic *How to Lie with Statistics*. Graph designers can make people believe anything — with the end result that most people believe nothing. The *Assessment Principle on Effective Communication* highlights the following three points about assessing progress:

- the assessment should be designed to address the needs of a specific audience and set of users;
- it should draw from indicators and other tools that are stimulating and serve to engage decision-makers
- from the outset, they should aim for simplicity in structure and use of clear and plain language

No-one could disagree with this principle unless they had sinister motives and a copy of Darrell Huff’s book. The principle applies particularly to the stage in every project to assess sustainability when the results have to be communicated to the audience, but in fact, simplicity, specificity and stimulation are pre-requisites throughout the cycle.

Stages in an indicators process:

Getting started

Raising awareness about the project, planning the next stages, and enlisting help. Who needs to be reached, and how will they receive the information? What time scale is there, and what resources are needed/available? Are there local champions? Who is the audience?

Deciding issues

The community thinks through and reaches agreement on the issues that are of most concern and interest. Questionnaires, interviews and workshops can be used to get people involved. All members of the community should be included. Everyone should be able to attend meetings. Disabled people, the elderly, those who work in the evenings may not hear about or can't turn up at a typical 6:30 public meeting on a wet winter evening.

Choosing indicators

Working from the list of common issues, one or more indicator ideas are selected for each issue. A basic list of criteria (e.g., meaningfulness, resonance) assist selection. The best indicators will strike a chord in the community. Sometimes they are quite controversial or embarrassing: in Jacksonville Florida, inhabitants are asked to name two local council members (accurately).

Gathering data

The resourcefulness of the community is harnessed to gather information. In Oldham, people looked at how many ponds had frogs in them. In Merton, disabled people did a survey of disabled facilities in local buildings. Schoolchildren are good (and cheap) researchers. Identify worthwhile data from official sources, too, and start thinking about what targets the community can realistically set.

Communicating indicators

Turning the information that has been gathered into understandable indicators for the specific audiences. This is a crucial but often neglected stage. Use relevant media: newspapers, local radio etc.; exhibitions; displays; publications; and material for schools. And be inventive.

Galvanizing action

The indicators are for education and action: to grab people's attention, make them think, get them arguing and spur them on. The audience includes the "powers that be" outside the community, who become more accountable. It's also time to start the whole process again — this could be a long-term project.

Source: New Economics Foundation, 1996

This is by no means a blueprint for a successful project; rather it is an outside analysis of what seems to have happened in a range of different projects. Nor need these stages be sequential.

If there is a common lesson, though, it is that if participation falters at any stage, it is increasingly difficult for the project 'champions' to regain it at a later stage.

Oh no! another book of graphs...

A major danger is when the technocrats in every project take charge of the data and get to work with their spreadsheets. This is unfortunately why so many exciting projects have such dull outputs, and fail to communicate.

Gary Lawrence at the University of Washington has talked about the MEGO syndrome: "My eyes glaze over", which describes the low level of stimulation most people feel when flicking through pages after page of ppbs (parts per billion) and all the other jargon and TLA's (three letter acronyms) so beloved of technical experts. Oldham reported on trends on low birth weight of infants — a powerful indicator — but the graph shows the percentage of babies born weighing less than "2499g". No mother in Britain knows what this means: babies are always weighed in pounds.

One of the sneakiest techniques used by local authority reports is to present the selected indicators — anything from 20-50 of them — without an overall summary showing which ones are getting better and which getting worse. Greenwich undertook a major community survey on attitudes towards poverty but neglected to report back the results to the interviewees — the results, which came out over a year later, were for officials only.

The typical sustainability assessment is a report full of graphs and pie charts. Both the size and the presentation are utterly unfamiliar to the general reader; no report of this sort will be found in people's homes. Merton forgot to put a copy of its excellent report in the local library. Even worse is when the project team tries to recoup printing costs by charging for the report — the average person only buys a couple of books a year and they won't be sustainable community reports.

Signs of hope

In contrast, a range of techniques can be used at each stage of the process to build interest and excitement. Whether these are Parish maps in the Mendips, community theatre in Northern Ireland, Planning for Real in Kyle of Lochalsh, street surveys by schoolchildren in Peterborough or barbecues in Seattle, they are a mixture of old and new, familiar and exotic, easy and difficult. Projects are trying out posters and postcards, the World Wide Web and painted vans, billboards and road shows. Some techniques work only for a particular audience or part of the process; other projects are characterized by careful attention to communication throughout.

The launch of the assessment should have some kind of a hook: events, personalities, photo opportunities, good headlines, good quotes. Things that make a good news story include conflict, immediacy, novelty, peril, locality, human interest (individual problems, stories) and victories. Ideas for launch events include music, art, drama, debates, benefits, picnics, videos, badges, stickers, comic books and other promotional material. In all of these, the key feature is a sense of immediacy in the communication process (see box).

Instant feedback:

In the small villages of Longformacus and Cranshaws, in the Scottish Borders, a survey of 100 households was undertaken, asking what priority they gave to a number of features of the community which had been ‘brainstormed’ by the community council. The results were analyzed and reported back to the community at a village hall meeting within two weeks. “Sadly lacking” was one comment about community spirit; “It would be wonderful”, said another. Many suggestions were put forward, in particular for a cheap and regular community newsletter. Over a third of respondents said that it would help if people could regularly find out if the community was making progress towards its goals. A couple of budding writers stepped forward to take on the task. So far, five issues of the popular *Cranshaws and Longformacus Newsletter* have come out.

In Blackburn, Lancashire, the community carried out a survey and the results showed that older people were afraid to go into the town centre after dark because of the young people hanging around. When the results came out the young people wrote an open letter to the town explaining that they hadn’t been aware of the problem — it was simply that they had nowhere else to meet.

Source: New Economics Foundation, 1997

Community indicators offer a powerful tool for change, so long as the principle of effective communication is adhered to. Do they work? New Economics Foundation certainly believe so, which is why, with the support of the World Wide Fund for Nature and Environmental Action Fund, the foundation is just starting to work with another four community groups throughout the UK. These are small communities such as Longformacus, where participation can be very broad. But at the rate of four communities a year, it would take us 69,000 years to cover the UK population. That is why we are developing a community indicators resource pack, to provide enthusiasm, examples and encouragement to the many community groups who are ready to get started.

The Community Indicators Resource Pack is a practical self-help guide for community groups to develop their own indicators. Indicators are tools for simplifying, measuring and communicating important issues

and nowhere are they more necessary than in the debates about quality of life and sustainable development.

Community-based indicators have three main functions:

- Making your voice heard on issues affecting your area. Target audiences might include local authorities, businesses, financial sponsors or government (Example: campaigning against an out-of-town supermarket).
- Strengthening your argument, raising awareness about the benefits of what you are doing and demonstrating the need for action. This is essential if you are to be effective in bringing about change.
- Capacity building — learning new skills and strengthening community relationships. Working with indicators will help you decide what your priorities are and what you want to achieve, monitor your progress, decide what action you need to take and celebrate your achievements. You can use indicators to develop skills and confidence as a group and build relationships within your community, with local businesses, the council and other organizations.

The pack contains:

- Details of how to get started on deciding which issues are most important, choosing your indicators and carrying out local surveys and questionnaires.
- Using other sources of information, such as the Register of local common land and town and village greens, and where to find them.
- Techniques for communicating, such as parish maps, planning for real exercises, timelines, priority search and community drama.
- Information on how to take practical action in your area, including setting up food co-ops, community businesses, car-sharing schemes or community land trusts.

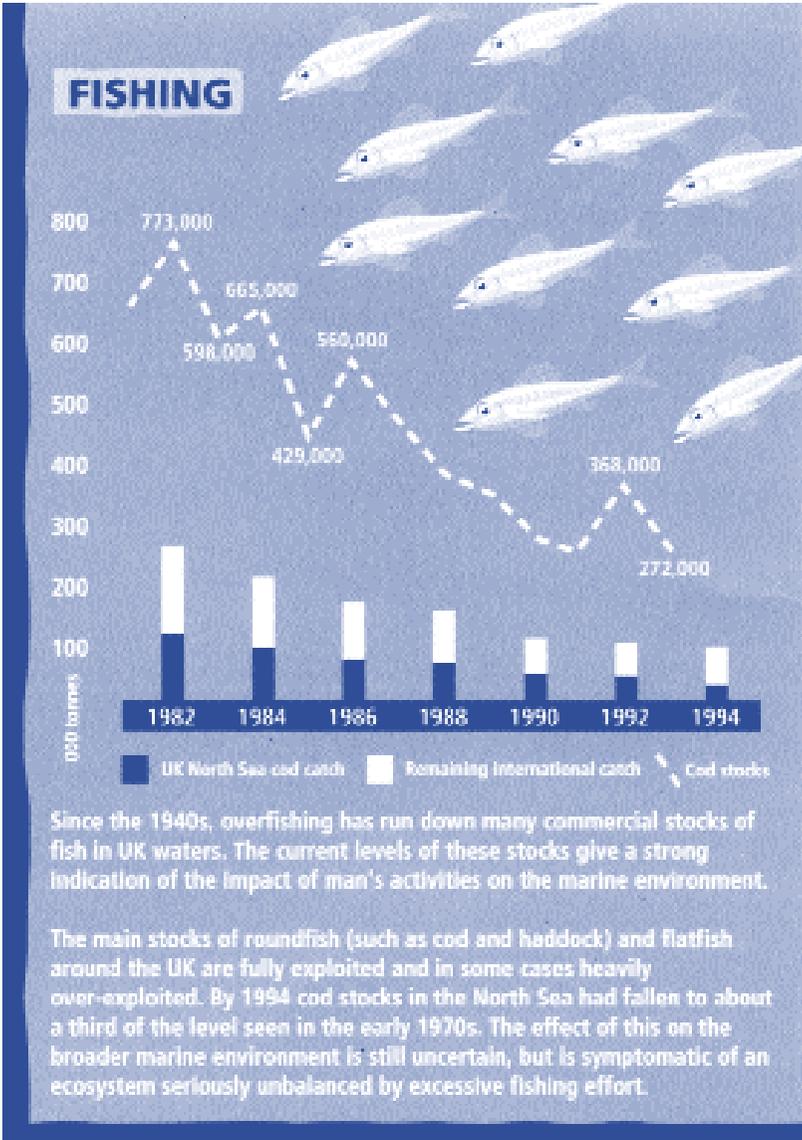
Resources:

- Sample questionnaires, press releases, publicity leaflets, posters, newsletters, petitions and other materials for you to photocopy.
- Details of where to go for advice or more information.
- Useful books and videos and where to get hold of them.

The pack is being put together by the New Economics Foundation in partnership with four community groups. It contains real-life experiences of running workshops, setting up a newsletter, carrying out surveys and

organizing events, including what we have found successful, what didn't work so well and why.

Other community projects from around the country are shown on a map at the back of the pack, with contact details for more information.



Indicating declining fish stocks

Source: GreenGauge

Practice:

There are now over 30-40 groups in the UK developing indicators. The resource pack provides an outline of these together with quotes and case studies illustrating lessons learned so far. Groups just starting to work on indicators have identified a need for someone to pull material together so that they're not reinventing the wheel.

Outputs:

With the roundup, a full colour map which will illustrate the techniques and issues is being produced. New Economics Foundation is preparing a design brief and is organizing a design competition in association with the World Wide Fund for Nature.

Communicating indicators:

Visually engaging techniques that have been used to date include "Green Gauge" and practical exercises such as the Reading flag. In Mendip indicators are being incorporated into a mapping project. *Going for Green* are using computer software to help people define their ecological footprint. In The Hague, Netherlands, a thermometer with targets is used. New Economics Foundation is also advising on a television programme which will carry out "community challenge" tests such as how hard it is to recycle a bag of waste — this is backed up by a survey and scientific research.

Alex MacGillivray is co-ordinator of a team working on community indicators at New Economics Foundation (NEF), the research charity working for a just and sustainable economy. NEF has been involved in a wide range of community indicators activities in the UK and elsewhere. NEF produces a free-subscription quarterly newsletter called *Indicators Update*. The community indicators resource pack will be available in September 1997. Contact New Economics Foundation at: 1st Floor, Vine Court, 112 Whitechapel Road, London E1 1JE, UK, or at e-mail address: neueconomics@gn.apc.org.

References

- 1 Macnaghten *et al.*, 1995: Macnaghten, P., Grove-White, R., Jacobs, M. & Wynne, B., 1995, *Public Perceptions and Sustainability in Lancashire: indicators, institutions, participation*, Centre for the Study of Environmental Change, Lancaster University, Lancashire County Council, UK.
- 2 Eurostat, 1995, *Europe in Figures: 4th Edition*.
- 3 Macnaghten *et al.*, 1995, *ibid.*
- 4 Macnaghten *et al.*, 1995, *ibid.*

Assessment Principle # 8: Broad Participation

Assessment of progress toward sustainable development should:

- *obtain broad representation of key grass-roots, professional, technical and social groups, including youth, women, and indigenous people — to ensure recognition of diverse and changing values*
- *ensure the participation of decision-makers to secure a firm link to adopted policies and resulting action*

Sustainable Seattle: The Indicators of Sustainable Community

Kara Palmer and Richard Conlin

Summary: Sustainable Seattle is a volunteer citizen's network committed to establishing indicators for measuring progress toward sustainable development in the Seattle area. This work is intended to improve the region's long-term well-being. Sustainable Seattle, developed and produced two reports on *Indicators of Sustainable Community* between 1991 and 1995. Selected and researched by over 250 citizens, there are 40 cultural, economic, environmental, and social indicators that assess Seattle's progress towards sustainability. Both the participatory process used to define the indicators and the extraordinary volunteer energy devoted to research them are hallmarks of this citizen-led initiative to hold policy makers and the general public accountable for the city's well-being over time.

For more information contact:

Kara Palmer & Richard Conlin, Co-Directors, Sustainable Seattle,
Metrocenter YMCA,
909 Fourth Ave, Seattle, Washington 98104, USA,
Tel: 206/382-5013, ext. 5072
Fax: 206/382-7894,
e-mail: sustsea@halcyon.com,
<http://www.scn.org/sustainable/susthome.html>

Introduction

Seattle, Washington, situated in the north-west corner of the United States, has the reputation of an economically prosperous city that is “clean and green.” Despite its image, Seattle struggles with the same questions that many communities around the globe do: How do we balance concerns for social equity, ecological integrity, and economic vitality? How do we create a liveable community today while ensuring a healthy and fulfilling legacy for our children’s children?

It was questions like these that brought over 70 community leaders together for a one-day forum in November 1990. Sponsored by the Washington, DC, based Global Tomorrow Coalition (GTC), the forum was one of several which GTC organized in American cities that might be open to the message of sustainability. Locally, the forum was organized by a small team of people who were brought together by Kay Bullitt, a local environmental advocate and visionary. At this public forum people representing diverse affiliations, from church groups to government, discussed definitions of sustainability and how citizens might develop their own ways to measure Seattle’s long-term well-being.

Sustainability was a relatively new concept to most people in Seattle and around the country. While the Brundtland Commission report, *Our Common Future*, and its eloquent definition of sustainable development: “meeting the needs of the present without comprising the ability of future generations to meet their own needs,” had put the notion of sustainability on the international map, Americans expressed little interest in the concept, and there was very limited public awareness of this emerging idea.

Defining Indicators of Sustainable Community

It was the challenge of integrating economic, environmental, and social values and the opportunity to define new measurements of progress that moved Seattle citizens to continue meeting and give birth to the volunteer civic effort called Sustainable Seattle. Building from the excitement and discussions of that initial gathering, the group decided that the concepts and values of sustainability needed to be part of public and private planning. Recognizing a basic need for new ways to gauge our condition as a community, Sustainable Seattle sets as its main task to define, research, and publish a set of “Indicators of Sustainable Community.” Focusing on how to measure sustainability proved a tangible project for developing a common understanding of its meaning. Moreover, indica-

tors would provide important information to serve as a foundation for civic activism, future policy work, and private sector planning.

Between November 1990 and May 1991 Sustainable Seattle concentrated on carving out its identity, creating an organizational structure, and developing a definition of sustainability by a consensus process: “long-term health and vitality — cultural, economic, environmental, and social.” (Note that the key elements of the definition are in alphabetical order so as not to put more emphasis on one over another.)

Sustainable Seattle’s Indicators Task Team, comprised of people with diverse backgrounds, including an economist, energy specialist, engineer, social worker, city planner, met regularly to brainstorm and research possible indicators. By January 1992, they produced a draft list that proposed 150 indicators divided into categories of primary, secondary, and “provocative”. Sustainable Seattle decided that a broad based community involvement effort would provide additional perspectives based on community experience and diverse expertise. The idea was to capture community values in the context of sustainability by opening the discussions up to a wider audience.

In April 1992 the “Sustainable Seattle Civic Panel,” was formed. Individuals from business, environmental groups, government, the religious community, social activism, and academia participated in a dialogue on the meaning of sustainability. Their objective was to collectively



Volunteers for Sustainable Seattle

determine what aspects of the community were important to measure, and which of the 150 indicators were the most appropriate to use.

Recruiting Broad Participation

The Civic Panel continued work through 1992. The public participation process was invaluable in providing depth and a range of knowledge about community life. Participants gave serious thought to all the dimensions of sustainability; providing critical thinking about the best indicators of sustainability — cultural, economic, environmental and social; and building support, enthusiasm and belief that a community can find new and better ways to measure its own progress.

The design of the Civic Panel brought together some of the most active citizens in Seattle and engaged them in a dynamic workshop process leading to specific and credible results. But the panel needed to be “sustainable” in terms of the commitment it required from already busy people. Sustainable Seattle sent invitations to 300 citizens leaders in grassroots, professional, government, technical, and social groups. Effort was made to equally involve men and women, and to include active citizens of different ages, cultures, and lifestyles. Initially 200 agreed to participate, pleasantly surprising the organizers, who interpreted this as an ‘indicator’ that many citizens were concerned about the future and interested in the more systemic perspective that sustainability provides. Ultimately, 150 people participated in a process of determining indicators. Between April and December 1992, four workshops were held, and resulted in developing consensus recommendations for key sustainability indicators.

Steps in the Indicator Development Process

Workshop #1: Civic Panel Orientation

The first meeting of the Civic Panel appropriately coincided with the June 1992 United Nations Conference on Environment and Development, familiarly referred to as the Earth Summit. Citizens gathered at the workshop to discuss cultural, economic, environmental and social challenges and hopes for the Seattle area. An outcome was broadening the objectives of a system of local and regional indicators for measuring progress toward sustainable development.

The Indicators Task Team spent from May 1991 to March 1992 working towards a draft list of indicators. At this June workshop it was eager to introduce the “Indicators of Sustainable Community” project to a broad audience and invite their participation and creativity into the process.

Each workshop participant received the potential list of 29 key indicators and 121 secondary and provocative ones, and a six-page feedback survey. For the remaining part of the workshop, participants formed small groups and discussed perceptions and visions of a sustainable future. Participants envisioned one generation from now, in 2022, and identify what evidence they might find that indicates we have become a sustainable society. They were also asked what hopes or interests they had for the Civic Panel process. The evening concluded with a buzz of enthusiasm and the pervasive feeling this was the beginning of something uniquely important to the community's future well-being.

First Review & Feedback By Mail

Between July and August 1992, Civic Panellists reviewed the first draft list of indicators and recorded their comments via the written feedback survey. The process was designed so that panellists could individually review the draft list in a way that was paced according to their own schedules and that could be completed without additional meetings. Some attached extra sheets of typewritten comments to explain their ideas.

The Indicators Task Team studied and synthesized the written feedback. In preparation for the next workshop, the Civic Panel divided into topic areas (according to their interest and knowledge), and developed a draft set of revised key indicators, in addition to framing comments and discussion questions.

Workshop #2: Topic Groups Develop Key Indicators

The Sustainable Seattle Civic Panel met for the second time in September 1992 to begin detailed work of designing key sustainability indicators. A progress report was given and the Civic Panel members divided into the ten topic groups: Resource Consumption, Education, Economy, Transportation, Natural Environment, Health, Social Environment, Culture & Recreation, Population, and Community Participation. The panel came to agreement about what criteria would guide inclusion or exclusion of indicators. Then with a list of draft indicators as their starting point, each group worked to select and refine a list of 10 potential indicators for each topic area.

Several important considerations arose throughout the process that affected the indicator selection. For example, the panel questioned whether indicators should be global measures versus local trends, and it decided to identify indicators that measured progress toward greater self reliance. Panellists struggled with whether to measure input variables, such as the amount of money budgeted for some program, or outputs, such as the

results of that program's implementation. Panellists agreed to focus on outputs. Another issue was whether to highlight negative trends or concentrate on the positive. For example, the indicator "Youth Involvement in Community Service" carries a positive connotation, while the indicator "Juvenile Crime" has a negative trait. While most people believed an optimistic approach would attract more attention, it was impossible to find such measures for each issue. In the end the panel agreed to using a mixed approach.

Workshop #3: Towards Consensus on Key Indicators

The goal for the Civic Panel's October 1992 workshop was for agreement on the three to five best key indicators for each topic area. To refresh people's energy, the workshop was structured to include reflection time about the group's visions and hopes for the project. Topic groups then reduced their indicators list down using criteria for good indicators that were developed from the Sustainable Seattle goals. The organizers set some overall criteria to guide selection. Indicators needed to be:

- reflective of trends that were fundamental to long-term cultural, economic, and environmental health
- statistically measurable, with data preferably available for one to two decades
- logically or scientifically defensible
- attractive to the local media and
- comprehensible to the average person.

By the end of this workshop, each group reported their results to the Civic Panel and shared ideas on how to publish and use these indicators in the community. Some groups felt the need to meet independently one last time after this workshop, while others completed their work by telephone. Many groups only achieved consensus by expanding the number of indicators they included. The workshop produced 99 indicators.

Workshop #4: 99 Indicators, Priorities, and Celebration

In December, 1992 the Civic Panel held its final workshop to review the proposed "Indicators of Sustainable Community." All 99 indicators were displayed in large print on a wall. The meeting began with a 'dramatic reading' of the 99 indicators interspersed with poetry, quotations, and stories that illustrated the values and principles of the project. As a last priority-setting exercise, Civic Panellists participated in a 'green dot game' in which they each selected five indicators from the menu of 99 that

seemed most useful in providing a snapshot of community sustainability, and then placed dots emblematic of their interest on the chart of indicators. “Wild Salmon”, originally considered a provocative indicator, received the most green dots, indicating a high preference.

Next, the Civic Panel considered how the indicators were linked to one another. They worked in pairs and small groups to develop ‘chains of causation’ between key indicators. After a lunch time demonstration of an electrical scooter and a musical interlude, Panellists set to work on brainstorming strategies for putting the indicators to work in business, education, the media, communities, and policy-making. The workshop concluded with a joyful celebration of the successful completion of the Civic Panel’s work.

Research and Data Collection

There was some expressed desire for developing a single index of sustainability to report to the public. Sustainable Seattle decided not to aggregate the indicators. There were difficulties expressed for determining the appropriate weight and importance of each indicator. It was also felt that in many cases the indicators were not comparable to each other. Moreover, it seemed that aggregation was a basic problem with the Gross National Product. Keeping the sustainability indicators separate provided a richer presentation of progress. However, there was also general agreement that 99 indicators were too many for either decision makers or the public to digest. Therefore, the Indicators Task Team was charged with further reducing the list down, giving consideration to issues of measurability, data availability, and professional credibility. Civic Panellists were invited to join the ongoing Sustainable Seattle Indicators Task Team for next steps, and some of them did. The Indicators Task Team worked until March 1993 narrowing the list to 40 indicators that would represent a ‘whole system’ or ‘whole city’ snapshot of movement towards or away from sustainability

The intent was to collect data extending back 10 to 20 years and establish long term trends. For indicators that had never been measured, Sustainable Seattle would be creating a baseline for the future. Volunteers set out to collect data by researching published documents and contacting universities, private businesses, and government agencies. Data availability or lack thereof often forced changes in the indicator selection. Task Team members strove to find meaningful measurements that corresponded with the Civic Panellists’ intentions. For example, “Homelessness” was altered in the research process to “Housing Affordability”, which experts

said was a more reliable source of data and a better indicator of the conditions that breed homelessness. In some cases (notably Youth Involvement in Community Service), even though data was not found to be available, the indicator was considered to be so important that Sustainable Seattle chose to report it without including data. For three indicators, data was not available but could be measured through a public opinion survey, and Sustainable Seattle obtained funds from the United States Environmental Protection Agency and commissioned a polling firm to conduct the survey.

Many Panel members helped find and collect data through existing sources and served as peer evaluators and reviewers to assure that all information was reliable, defensible and meaningful. People from local government, schools and universities, businesses and research groups contributed their time and essential resources. All in all, hundreds of volunteers came together to create this community report-card. And many have continued to spark indicator projects in the Seattle region and elsewhere around the United States and the world.

Sustainable Seattle defines itself as a volunteer network, and more than 200 volunteers were involved in the indicators process. From 1991 to mid 1995, Sustainable Seattle operated with only a quarter time staff person, with all other activities conducted by volunteers. In 1995, Sustainable Seattle moved to a full-time staff person to expand and co-ordinate the range of activities in which it is engaged. The total budget for the two years of indicators development, 1992-1993, was approximately \$20,000, which was funded by small grants from the United States Environmental Protection Agency, the New Road Map Foundation, and The Boeing Corporation. An additional \$30,000 was spent in 1994 and 1995 on developing the second publication, much of which was funded from the sale of the reports.

Producing the Indicators Report

For the first publication, an initial subset of 20 indicators was selected since finding appropriate data sources proved more challenging than originally considered. In November 1993, Sustainable Seattle produced its first Indicators of Sustainable Community report. It was 'good timing' as the publication of the report paralleled the City of Seattle's efforts to develop a Comprehensive Plan for managing growth over the next 20 years. The planning department director and other city officials began to support Sustainable Seattle's indicators project because its goals seemed to complement those of the city. The 1993 report was presented to the US

President's Council on Sustainable Development, the Global Forum in Manchester, England, the European Commission, international forums from Hungary to Argentina, and in many US cities. Quite unexpectedly, by 1994, the indicators had become seen as a model effort with communities from Europe to Taiwan expressing interest in adapting them.

Juggling between making public presentations and responding to inquiries, Sustainable Seattle volunteers spent the ensuing two years researching the next set of 20 indicators as well as updating the first grouping, to produce a complete survey of 40 key long-term trends: *"Indicators of Sustainable Community 1995"*. With the second publication, came more success. Local media picked up the story, *"Robust? Going Bust? Taking City's Pulse"* being one of the front page headlines in the local newspaper. Having built up its reputation over the years, both the Mayor of Seattle and President of the City Council remarked on the value of the indicators project and its implications for Seattle. In the Spring of 1996, Sustainable Seattle was honoured with a Vision 2020 award from the Puget Sound Regional Council, a local government consortium focused on growth management, economic, and transportation strategies. And most recently in 1996, Sustainable Seattle was recognized by the United Nations Centre for Human Settlements with an *Excellence in Indicators Best Performance* by the Community Sector, awarded at the Habitat II Conference in Istanbul, Turkey.

The indicators provide a snapshot of Seattle, where perceived quality of life is high, but where many of the trends are undermining the things people love about living in the region. Of the 40 trends surveyed, ranging from air quality and biodiversity to farm acreage and children living in poverty, 14 are carrying the city in the wrong direction, often at an alarming pace. Only eight are moving the city toward sustainability. The remaining 18 indicators are either unchanged or do not yet have enough data to reveal a trend — but half of these are at levels considered to be unsustainable in the long term.

Target Audience and How the Indicators Have Been Used

The Indicators of Sustainable Community are meant to guide decision makers and average citizens in personal and collective changes that will steer the community on a more sustainable course. The broad participation that went into developing the indicators has given the project legitimacy. As a citizen-led initiative, Sustainable Seattle has brought together unlikely partners to discuss how to balance economic, environmental, and social goals. Being 'outside' the government, the group has been able to take

more risks, to measure things that are not directly linked to policy, but that need to be brought to the forefront of discussion. The indicators have not been officially adopted by the city, yet they have heightened policy makers' awareness about sustainability and influenced both the city and the county in developing their own sets of indicators (which include some from the Sustainable Seattle list).

Because of the perceived benefits to having a citizens' "report card," Sustainable Seattle will continue to produce the indicators report biannually. The first five years spent on defining, researching, and publishing the indicators, however, are just the beginning in moving the city toward sustainability. The next steps involve action — paying attention to what is being communicated, exploring the linkages and connections between the trends, and shifting behaviour and actions to ensure the community's well-being over time.

The public is yet to embrace the indicators as a tool for guiding decisions and actions that affect the sustainability of the region. In looking toward the next five years, Sustainable Seattle will develop a *Guide to Sustainable Living* for individuals to adopt behaviour changes resulting in the indicators moving in a positive direction. The group will also continue to focus on engaging decision makers to reassess government priorities and policies and supporting other institutions in altering the way they do business.

Principle of Broad Participation

Sustainable Seattle is an example of the concept of broad participation in action. All the work and the publications that have resulted flow from a commitment to a participatory model. With hundreds of volunteers already invested in the community's future through their participation in the indicators project, Seattle is building a sustainable vision.

Effective participation requires strong facilitation skills, an openness on the part of the public, considerable patience, and the willingness to expend time and resources on engaging the public effectively. Above all it requires a commitment on the part of the organization to share ownership of the project and its outcomes. Common to community initiatives, Sustainable Seattle is led by a relatively small group of committed people, but this group both deeply believes in participation and was willing to make that principle a key to indicators development. It is not enough to have a verbal commitment: only when that is translated into action through the process of broadening the group's base and involving others in sharing the vision will participation truly be effective.

The Sustainable Seattle model can be — and has been — used effectively locally, nationally, and internationally. Locally, it has inspired neighbouring cities and civic organizations to develop their own processes. Nationally, Sustainable Seattle volunteers and publications have helped to encourage dozens of other cities to begin indicators processes — a survey of local indicators projects around the United States conducted by Redefining Progress found that Sustainable Seattle was the most frequently cited model. Internationally, Sustainable Seattle is currently involved in a project with the International Institute for Sustainable Development in Winnipeg, Canada and Guadalajara, Mexico, to exchange information and foster indicator development.

Sustainable Seattle's publications have reached a wide audience. In addition to its indicator reports, Sustainable Seattle developed a handbook, entitled "*A Primer for Creating New Measurements of Progress*", for use by the King County Children and Family Commission at a conference in 1996. The booklet has been partially translated into Spanish.

The key messages from the Sustainable Seattle project are:

1. People can become passionate about sustainability and about indicators
2. The very broad and initially intimidating subject of sustainability can be effectively addressed and described on a local basis by residents
3. People from diverse backgrounds representing all sectors of the community work well together in the context of sustainability; in fact this is necessary for sustainability indicators to be relevant
4. The process of creative and active public participation combined with advice and information provided by experts, generates cohesive, and logical indicators that reflect real community values and practical experience
5. Effective and patient facilitation develops a sense of trust among a diverse group allowing the creation of a substantial and respected product
6. When developed outside of established authorities, but not exclusive of them, and by a diverse group, indicators can exemplify the process of democratic governance. The process and product demonstrate the idea of people taking charge of their own measurements of progress. It may be a far-reaching innovation that can bring about a new sense of civic engagement

Assessment Principle #9: Ongoing Assessment

Assessment of progress toward sustainable development should:

- *develop a capacity for repeated measurement to determine trends*
- *be iterative, adaptive, and responsive to change and uncertainty because systems are complex and changing*
- *adjust goals, frameworks, and indicators as new insights are gained*
- *promote development of collective learning and feedback to decision making*

Assessing Progress Toward Sustainability in Developing Countries

Adil Najam

Summary: An IUCN (The World Conservation Union)/IDRC (International Development Research Center) project on 'Assessing Progress Toward Sustainability' entered its second phase in 1997. A cross-disciplinary international team, working in the field with local teams in Latin America (Colombia), Africa (Zimbabwe), and Asia (India), tested, adapted and refined an approach and translated it into a set of methods that can be applicable in a wide range of contexts — at the local, regional and national levels. The purpose of the second phase is to extend, consolidate and disseminate the lessons learned and build capacity for assessing sustainability.

For more information contact:

Nancy MacPherson
Coordinator, Programme on Strategies for Sustainability
IUCN—The World Conservation Union
Rue Mauverney 28, CH-1196 Gland, Switzerland
Tel: ++4122-999 0001
Fax: ++4122-999 0025
e-mail: NMM@hq.iucn.org
<http://www.iucn.org>

Background

IUCN (The World Conservation Union) has an ongoing interest in practical approaches to assessing progress toward sustainable development. In 1980, IUCN — along with WWF and UNEP — produced the *World Conservation Strategy* which introduced the term ‘sustainable development’ to broader audiences. In addition, IUCN has been instrumental in developing National Conservation Strategies in more than 75 countries¹.

It was within this context that project managers from Asia, Africa and Latin America asked the IUCN Strategies for Sustainability Programme, in 1992, for assistance in monitoring and evaluating sustainable development initiatives. In 1993 IUCN and the New Delhi-based NGO, Development Alternatives organized a workshop focusing on sustainability indicators. A wealth of information on indicators was put forth, but the connection between indicators and progress toward sustainable development remained unclear. This reinforced the message from field practitioners: they too were finding it difficult to make the connection between indicators and actions needed to progress toward sustainable development.

Meanwhile, in Canada, the International Development Research Center (IDRC) had undertaken a comprehensive review of sustainability indicators and concluded that a conceptual framework for the process of assessment was needed prior to actually addressing specific indicators. The results of these parallel streams of thinking lead IUCN and IDRC to a shared concern about the common interest in establishing methods for assessment. Both the IUCN and IDRC were committed to linking theory to practice by combining research, development and field-testing. This commitment triggered the IUCN/IDRC Project on Assessing Progress Toward Sustainability. The first phase of the project lasted from 1994 to 1996 and the second phase began in early 1997.



IUCN field project, Zimbabwe

The aim of the IUCN/IDRC project was to develop a practical approach for assessing progress toward sustainable development that would be useful in a variety of geographical settings and policy contexts. As the first step in the process, a cross-disciplinary international team was formed. Team members contributed skills in participatory development, communication, state-of-the-environment reporting, monitoring and evaluation, strategy formulation, and policy implementation.²

The international team saw its task as one of action research where field realities and priorities were more important than academic elegance. The international team linked up with national teams working on local strategies for sustainability in Colombia, Zimbabwe, and India³ so that the approach and methods could be validated and tested in real decision making processes in different social-political settings. These three countries provided the project the desired degree of diversity in social, economic, political and environmental variables for developing the approach and testing the methods.

The close collaboration and shared learning experience of the international and national teams has been one of the most enriching aspects of the project. The concept, the approach, the various methods and the tools

were not just ‘tested’ by the three national teams: they were conceived, developed and revised in light of the field experience.

Phase I has: created a concept and an approach for assessing progress toward sustainability; advanced the development of a set of methods and tools; and, applied these in the three pilot countries. The second phase of the project, which is just beginning, will focus on extending, consolidating and disseminating the learning from Phase I and on building capacity for assessing sustainability. The experience and learning from Phase I are discussed in more detail below.

Concept and Approach

A fundamental principle for sustainable development is that human well-being — that is the health, wealth and quality of life of people, is part of, and linked to the diversity, productivity and quality of the ecosystem. Consequently, sustainability depends on improving and maintaining the well-being of people and the ecosystem together. This fundamental coupling of the human system as an integral part of the ecosystem is visually depicted in the simple yet powerful schema of the ‘egg of sustainability’ (Figure 1).

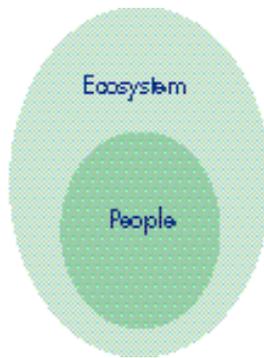
This very same fundamental coupling, however, gives rise to a constant tension which exists between the needs of people and the ecosystem and between different groups of people. These tensions must be addressed if



District-level planning in Karnataka state, India

we are to develop combinations of human and ecosystem well-being that will eventually be sustainable. Moreover, no one knows exactly what these combinations of well-being are or how to achieve them. Progress depends, therefore, on acknowledging our ignorance and uncertainty, and founding our actions on questions and learning, through groups of people reflecting and acting on their situation.

Figure 1: The Egg of Sustainability. Human societies are an integral part of the surrounding ecosystem, like the yolk of an egg within the white. They are likely to be sustainable only if both the human condition and the condition of the ecosystem are good or improving. If the condition of either is poor or worsening, the society is unsustainable.



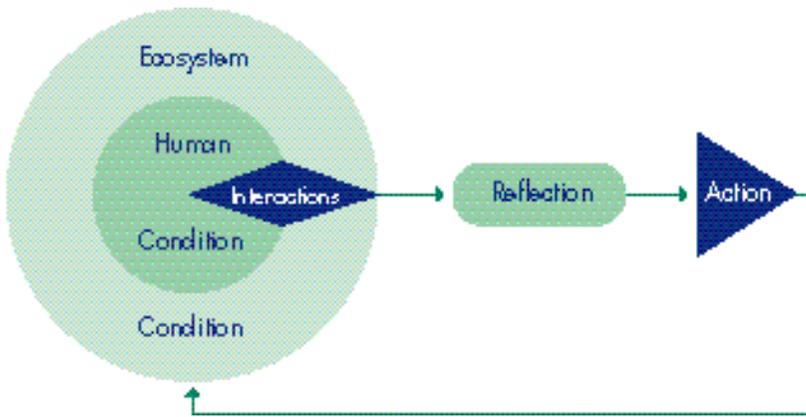
Action and reflection are seen as part of a continuous cycle in which action is consciously seen as an instrument of reflection (Figure 2). To learn as they act, and thereby act more effectively, organizations (governments, non government organizations, communities, corporations) need to develop a culture of assessment. Assessment consists of three elements: diagnosis explains why the action is necessary; monitoring follows its progress; and evaluation draws conclusions about both progress and outcome. This project which was itself designed as a learning process, has found that assessment is also best understood as a learning enterprise.

The various methods and tools developed as part of this project have two fundamental features in common.

They treat people and the ecosystem together as equally important. People are an integral part of the ecosystem. The well-being of one is bound in the well-being of the other. It follows that sustainable development entails improving and maintaining the well-being of both.

They foster questioning. The key to assessment is asking questions. Only when we know what questions we are trying to answer can we find indicators and other tools to help us. The more an assessment method requires users to question their assumptions and expose their judgements to scrutiny, the more robust the method will be.

Figure 2: The Reflection-Action Cycle. Reflecting on the system (people within the ecosystem and interactions between them) informs actions to improve the condition of the system. In turn, the actions test the assumptions and hypotheses of reflection.



Method and Tools

In refining its approach for assessing progress toward sustainable development, the project found that although any number of ‘methods’ of assessment could be devised, there are at least three distinct — though often overlapping — types of assessment:

- Project assessment An assessment of the conduct and results of a project or other discrete set of activities.
- Self-assessment An internal assessment by an organization or group of people.
- System assessment An assessment of the human and ecological system and their interactions. This may be at any scale.

System assessment is aided by self-assessment — that is, an internal process of reflection by the group assessing the human and ecological system. Project assessment is aided by an understanding of the system (requiring a system assessment) and is best carried out by a reflective organization (requiring self-assessment). Organizations working toward sustainable development should do all three types of assessment. However, few do so. A major limitation has been the lack of assessment methods that could be used under a variety of conditions at various levels, from local to international. Phase I of the project has tried to address this limitation and developed and tested methods for all three types of assessment:

System assessment

- *Participatory and Reflective Analytical Mapping (PRAM)* is a method to help planners, field workers, and researchers reflect on a system from an early stage and thereby assist in identifying priority areas for action and research. PRAM can be used to assess any spatial region from a continent to a village.
- *Assessing and Planning Rural Sustainability* is designed for use by support teams and rural communities working together. Tools for community participation are used throughout.
- *System Analysis and Planning* is a method for assessing human and ecosystem well-being and institutional strengths and limitations. It includes identification of priorities and options, design of development strategies and action plans, and formulation of an implementation and monitoring framework. A supplementary method, *Strategic Negotiation for Community Action*, is used to develop a consensus on the priorities and actions among local communities and other key stakeholders.

Self-assessment

- *Systematic Analysis of Experience* provides a framework to recover, analyze, record and learn from the experience of organizations and projects.
- *Development of Reflective Capacity* is designed to help an organization develop a capacity for reflection by clarifying its mission, analyzing what makes and institution reflective, and then restructuring accordingly.
- *Institutional Implementation Capacity Assessment* helps organizations evaluate their capacity to carry out their mission and projects. The method contrasts the demands on the organization

generated by its mission and objectives with its capacity to supply them.

Project assessment

- *Logical Framework Analysis (LFA)-based Project Assessment* is a method of project monitoring and evaluation for use within the planning framework of reflective organizations.

To facilitate the use of these methods within and beyond the network of this project, a number of training booklets have been prepared. These booklets explain the methods and related ideas in ways that allow easy application in different geographic or policy contexts. In addition, the project contributed to the development of various assessment instruments which include:

- *Map Maker* is a user-friendly Windows-based software for making maps and displaying data on maps. It has been designed to be used by non-experts while still having a sophisticated capacity for complex analyses of varied data. Map Maker was designed specifically for development projects and includes support for carrying out field surveys.
- *The Barometer of Sustainability* is a tool for measuring and recombining indicators into a picture of human and ecosystem well-being and progress toward sustainability.
- *Questions of Survival* is a set of questions about people's relations with each other and the ecosystem. Its main purpose is to support self-assessment, but it has also been useful as an introduction to system assessment.

Experience in the Field

The approach, methods and tools were developed through intense field experience of applying and refining them in Colombia, Zimbabwe and India. Apart from the fact that the three countries are in three different continents with striking geographical and cultural differences, they also provided the project with three very different type of partner projects to work with in three substantively different policy contexts.

The Fundacion Pro-Sierra de Santa Marta, the partner institution in Colombia, is a major NGO with a long history of working in the area on issues related to sustainable development. The Fundacion initiated a major project for developing a conservation strategy for the Santa Marta region in 1993 with the German development agency, GTZ. The associ-

ation with the IUCN/IDRC assessment project coincided with the creation of a monitoring and evaluation unit at the Fundacion and a period of staff expansion and institutional restructuring within the organization. This contributed to a natural focus on project and self-assessment. As a result, the LFA-based Project Assessment method was developed in collaboration with the Fundacion. Similarly, the project developed the three methods of self-assessment, and tested one of them (Development of Reflective Capacity) in Colombia. One of the methods of system assessment, PRAM, also emerged from the Colombian experience.

The context in which methods were developed and tested in Zimbabwe was significantly different. Although, the project partners were once again involved in developing local strategies for sustainable development, in this case it was done through a government sponsored program led by the Department of Natural Resources in the national Ministry of Environment. The District Environmental Action Plans (DEAP) were just being initiated when the partnership with the IUCN/IDRC assessment project was established. This, and a prior commitment on the part of the DEAP leadership to a grassroots focus, enabled the development of a system assessment method with a very strong emphasis on tools for community participation. The application of the IUCN/IDRC approach to the DEAP context thus resulted in the Assessing and Planning Rural Sustainability method for system assessment.

The context was different again in India. Here the activities centred around a major national initiative for local conservation strategies, the Integrated Mission for Sustainable Development (IMSD). The lead agent and the IUCN/IDRC partner here was not a government agency but a major national NGO, Development Alternatives (DA). Given DA's past activities in the project area on 'wasteland' development and the IMSD's watershed focus, it was not surprising that system assessment methods emerged from this experience. The related methods of System Analysis and Planning and Strategic Negotiation for Community Action resulted from this partnership by merging DA's needs in implementing IMSD and the IUCN/IDRC project assessment approach.

The IUCN/IDRC Project and the Bellagio Measurement Principles

The primary goal of Phase I of the IUCN/IDRC Project was to develop an approach and a set of methods for assessing progress toward sustainability at various levels. The field experience furthers the development, refinement and testing of these methods. However, detailed evaluation of

the methods will be available only after extended application. It is apparent that the assessment approach and the various methods developed for the IUCN/IDRC project relate well to most, if not all, of the Bellagio Measurement Principles. Three of the Bellagio principles: a holistic perspective; ongoing assessment; and, institutional capacity, are especially pivotal to the IUCN/IDRC approach:

- Maintaining a holistic perspective and treating the human and the ecological systems together, as equally important, is a fundamental foundation of the project's approach to assessing progress toward sustainability.
- The project demonstrates that assessment is an ongoing process rather than an "end-of-the-pipe" activity which needs to be part of a continuous reflection-action cycle.
- The importance of a questioning approach and the institutional capacity to be a truly reflective and learning organization has been one of the key lessons.

The Importance of Ongoing Assessment

The IUCN/IDRC project defines assessment as much more than an exercise in deciding 'what's wrong'; rather, it is an effort to determine 'what could be improved.' The purpose of an assessment is also more than determining whether a strategy for sustainability has been a success. Assessments on progress should also be a learning experience that adjusts the design and implementation processes.

In its essential attributes, a good assessment process remains the same regardless of its geographic setting or policy context. In all cases, the purposes of assessment are to enable stakeholders to know where they are; to determine where they are going; to define where they want to be; to chart a course for getting there; and, most importantly, to be able to change that course in response to changes in information, values, resources, and priorities. For this to happen, assessment has to be an ongoing reflective process.

Sustainability is a dynamic concept. Assessment methods should also be able to adapt to changes along the way. At every stage of strategy design and implementation, assessment should facilitate a process which is able to influence, as well as respond to, changing conditions. The IUCN/IDRC project, and the various methods developed, embrace assessment as a continual and regular exercise rather than a sporadic and

separate event. Every step in the evolving cycle of a sustainability strategy should be assessed.

Whether assessment is seen as a component of the design and implementation cycle or as a separate periodic activity, good assessment should be iterative, integrative, and adaptive. It should be iterative because conditions, information, values, capacities and priorities are constantly changing; it should be integrative so that these changes can be accommodated (integrated) within strategies for sustainability; and it should be adaptive so that our actions and decisions can respond (adapt) to these changes. Good assessments, therefore, force stakeholders to rethink priorities, reset goals, and re-chart their course of action in response to new insights. When coupled with a questioning approach, assessments promote the development of a reflective capability within organizations and groups. Reflection helps people to learn and create channels for this learning to feed back into the decision making process.

Ongoing reflective assessment is equally important for all types of assessment, project, self, and system, because conditions are constantly changing within the contexts of institutions, projects, as well as systems. Judgements and decisions, and assessment methods are powerful only if they are able to identify, incorporate, and respond to these changes.

Institutional memories often become distorted and hazy over time. Ongoing assessment assumes a particular importance for self-assessment. All three methods of self-assessment devised as part of this project (Systematic Analysis of Experience, Development of Reflective Capacity, and Institutional Implementation Capacity Assessment) formalize a mechanism for continuous and ongoing self-assessment. Each aims at providing a framework which compels organizations and groups of individuals to continuously revisit and revise their aspirations, goals, priorities and strategies. These methods are designed to recognize, identify and respond to the various subtle changes that take place within institutions as new personnel join the group, as new activities are added, or simply as the existing people or activities mature and change over time. Any and all of these can produce significant changes within the group. Institutional changes are subtle and it is easy for individuals and institutions to underestimate the importance of assessing themselves. These significant changes are difficult to detect in the absence of ongoing self-assessment.

Similarly changes in the system and in project contexts are easily overlooked. For example, it is commonly recognized that ecological and human systems are dynamic entities and static analyses will give only partial assessments of true conditions. Most applied assessments, however,

are static. This is partly because ongoing, dynamic, assessment is, by definition, more difficult (at least more time consuming). If assessment is to lead to dynamic learning, it must itself be dynamic.

A common feature of all methods developed by the IUCN/IDRC project is the importance they attach to responding to the dynamic and ever changing nature of human and ecological systems through some form of ongoing assessment. For example, in Colombia a permanent monitoring and evaluation unit was created within the Fundacion Pro-Sierra Nevada de Santa Marta with the hope that it will become the repository of institutional learning and the vehicle for ongoing assessment. In Zimbabwe a system of ongoing assessment at the village level, based on indicators that the community will itself identify and monitor, is being developed.

The logic of ongoing assessment is built into the various methods. Even where the starting point is assessment at a particular point in time and space, for example through a map in Participatory and Reflective Analytical Mapping, or through participatory methods in Assessing and Planning Rural Sustainability, or through locking into an exiting LFA in LFA-based Project Assessment, the purpose remains to include this information in a larger (both in terms of time and space) understanding of the dynamic system. This is why the methods developed as part of the IUCN/IDRC project stress the importance of recurrent and ongoing assessment to respond to changing situations. The goal of assessment is to improve the system and only recurrent assessments can tell us whether the changes put into place as a result of prior assessment(s) have yielded the desired results and what new changes may be required now.

The benefit of any snapshot in time is improved by the ability to take many snapshots at many points in time and to compare, contrast and learn from the emerging trends. It is such dynamic and ongoing learning that all methods in the project aim for. The various tools that have been developed to support these methods are designed not only to provide reliable, quick and easy-to-produce snapshots in time but more importantly, to deliver reliable, quick, easy-to-produce and valid-for-comparison snapshots over time. For example, an important feature of both the Map Maker and the Barometer of Sustainability is their ability to interpret information in visually appealing formats. These tools are much less threatening than streams of numerical data and easy to understand, easy to interpret and easy to compare over time by anyone. That these tools are inexpensive, and require much less time and effort than others makes them especially attractive for use within an evolving and ongoing assessment process.

Lessons of Ongoing Assessment

- Assessment is not a process of determining ‘what’s wrong’; it is a process of learning. Sustainability is itself a dynamic concept and information, conditions, values, understanding, capacities and priorities are forever changing. Learning requires tracking these changes and to do so assessment must be ongoing and continuous.
- Ongoing assessment is critical to all types of assessment (project assessment, self-assessment, system assessment) at all levels and policy contexts (local, national, international). Assessment must be seen as a regular and integral exercise rather than a sporadic and separate event.
- Good assessment should force stakeholders to rethink priorities, reset goals, and re-chart their course of action in response to new insights. It should promote the development of a questioning attitude and a reflective capability within organizations and groups of people so that they can learn collectively and create channels for this learning to feed back into the decision making process.
- The utility of any snapshot in time is compounded manifold by the ability to take many snapshots over time and to compare, contrast and learn from the emerging trends. This calls for methods and tools of assessment which can deliver information and analysis which is reliable, quick, easy-to-produce, and valid-to-compare. Assessment, after all, becomes meaningless if the situation being assessed has changed over the time it took for the data to be analyzed — reliability, therefore, can often be more important than precision; and ease of presentation and interpretation can sometimes be a greater virtue than comprehensiveness and complexity.

References

- 1 IUCN/WWF/UNEP. 1980. *World Conservation Strategy*. Gland, Switzerland: IUCN/WWF/UNEP.
- 2 The International Team is managed by Nancy MacPherson of the IUCN Strategies for Sustainability Programme and includes: Ashoke Chatterjee (National Institute of Design, India), Eric Dudley (development consultant, UK), Tony Hodge (consultant, Canada), Alejandro Imbach (development consultant, Costa Rica), Diana Lee-Smith (Mazingira Institute, Kenya), Adil Najam (from Pakistan; currently at the Massachusetts Institute of Technology, USA), and Robert Prescott-Allen (PADATA, Canada).
- 3 In Colombia the project collaborated with the monitoring and evaluation unit of Fundación Pro-Sierra Nevada de Santa Marta (Natalia Ortiz and Hernando Sanchez). In Zimbabwe, its partners were the IUCN assessment team in Zimbabwe (Sam Chimbuya and Carmel Lue-Mbizvo) and the government's core District Environmental Action Plan (DEAP) team (Elliot Mhaka, Cephas Chidenga, Joseph Chizororo, Peter Gambara, Davison Haukozi, Zii Masiye, John Mbetu, Constantine Mushure, Aaron Tshabangu and Unity Tshabangu). In India the project collaborated with the Development Alternatives team working on district level planning in Tumkur district, Karnataka state (C. Ashok Kumar, Vijay Pillai, Subash Marcus and George C. Varughese).

Bellagio Principle #10: Institutional Capacity

Continuity of assessing progress toward sustainability should be assured by:

- *clearly assigning responsibility and providing ongoing support in the decision-making process*
- *providing institutional capacity for data collection, maintenance, and documentation*
- *supporting development of local assessment capacity*

Eco-Auditing and Sustainable Indicators in Norwegian Municipalities: Two Projects Illustrating the Development of Institutional Capacity in Norwegian Municipalities

Carlo Aall and Karl G. Høyer

Summary: Municipal accountability for sustainable development is emerging. Two projects, Municipal Environmental Auditing, and Policy Analyses for a Sustainable Development, are discussed in this case study. Norwegian municipalities are developing their capacity for assessing sustainable development at the local level.

Municipalities are testing, developing and evaluating eco-auditing, and assessing municipal policies using a set of core indicators. Twenty eco-audits were done in nine Norwegian municipalities between 1993 and 1996. The manual, *Municipal Eco-Auditing*, was produced. The project was financed by the Norwegian Board of Science and the participating municipalities, with a total budget of 4.7 million NOK (ca USD 720 000).

Policy Analyses for Sustainable Development is being conducted in six Norwegian municipalities in 1997. A system to assist municipalities develop “core indicators” is available, and is being tested within different municipal master planning processes.

For more information contact:

Carlo Aall and Karl G Høyer
Western Norway Research Institute
PO Box 163
5801 Sogndal
Norway
Tel: + 47 57 67 61 50
Fax: + 46 57 67 61 90
e-mail: caa@vf.hisf.no (Carlo), kgh@vf.hisf.no (Karl)

Local Government and the Environment — the International Context

At the International Union of Local Authorities (IULA) 30th World Congress held in Norway in 1991 the *Oslo Declaration on Environment, Health, and Lifestyle* was adopted. The Oslo Declaration charges municipalities with responsibility in the work towards sustainable development. The declaration turned out to be an important basis for the formulation of Local Agenda 21.¹

Agenda 21 points out that increased poverty, health problems, and a continued impairment of the earth's ecosystem cannot be solved through national efforts alone. Sustainable development is everyone's business. Chapter 28, (section 28.1 in Agenda 21) stipulates the significant role local authorities will have for making progress:

“As Agenda 21 deals with many problems and solutions originating in local activities, the participation and co-operation of the municipalities will be vital in the fulfilment of the objectives of Agenda 21”.

The content of municipal policies for sustainable development is specified in the main text of Agenda 21. Agenda 21's strong emphasis on the local authorities' role was included as a consequence of active lobbying on the part of the International Council for Local Environment (ICLEI); a sub-division of the IULA.²

.....and the Norwegian Context

Norwegian municipalities have been encouraged to address environmental issues in planning and operations since 1988. This was achieved through participation of 90 municipalities in the “Environment in the Municipalities-Programme” (EIM). In 1990 the state government

released its white paper on municipal environmental issues and provided funds for employing one environmental advisor in all Norwegian municipalities. Most municipalities now have a municipal advisor and some form of an environmental management system. Municipal political and administrative structures with defined responsibilities for environment issues are also established. Many of the municipalities have completed their first environmental planning cycle: established environmental objectives; prepared local state of the environment reports; and formulated action plans, called “Environment and Resource Programmes”.

Environmental auditing is the missing link between municipal planning and environmental protection in Norway. Increased demand for assessing results in the public sector has led to growing interest in accounting as a source of planning information.³ The *Planning and Building Law* obliges Norwegian municipalities to prepare municipal plans containing a written section and a legally binding area plan. Until recently there has been little incentive or requirement for municipalities to assess the effectiveness of their plans in the context of environmental issues.

In 1992 the new *Municipal Law* introduced regulations for municipalities to undertake administrative and management audits. The philosophy behind the new regulations is to check that resolutions are actually followed up, and whether there is a satisfactory correspondence between the expenditure of resources and results. This was accomplished by management audits and environmental auditing is regarded as an extension of this administrative auditing.

Effective since January 1992 the Norwegian Internal Control Regulations orders municipalities to implement a documented internal control system for health, safety, and the environment. Environment for local authorities is restricted to water, waste and municipal sewage. The internal control system is intended to ensure that activities comply with government laws and regulations.

Norwegian state authorities have worked on introducing Management By Objectives (MBO) as a concept for state management of local governments.⁴ This is also reflected in the government white paper on municipal environmental protection, advising municipalities to develop routines for eco-auditing:⁵

“(municipalities should implement)...eco-auditing...as a systematic, practical arrangement for result evaluation and identification of environmental problems in connection with further development of Management-By-Objectives”.

The Norwegian Ministry of Environment set up a Local Agenda 21 secretariat in January 1997. The secretariat will encourage local authorities to initiate local Agenda 21 processes in Norway.

Environmental Auditing as a Way of Evaluating

Auditing is a form of evaluating performed actions, whereby the outcome is assessed in relation to expectations. There are many definitions of environmental auditing. The following definition, acquired from suggestions for the ISO 14001-standard, incorporates most of the salient points:

“A systematic, documented verification process of objectively obtaining and evaluating evidence to determine whether specified environmental activities, events, conditions, management systems, or information about these matters, conform with audit criteria, and communicating the results of this process to the client.”

Municipal Environmental Auditing

Twenty eco-audits were conducted in 9 Norwegian municipalities. The following is an overview of the project:⁶

- Standard audit procedures: A standard methodology for auditing was derived from quality audits and the history of developing methodology for eco-audits dating back to the first initiative from the US-consulting firm Arthur D Little in 1977.
- Internal audit: Eco-audits were conducted as internal audits, meaning that the municipality itself orders the audit.
- Internal auditors: In addition the municipalities have used internal auditors.
- Open audit: The municipalities decided the scope and goal for the audit.
- Focus on organization: Audits concentrated on how the municipalities perform their environmental work, and marginally assessed the local state of the environment.
- Audit and follow-up: It is assumed the municipalities will respond to the audits and implement corrective measures.

There are three functional activities where eco-auditing has been tested:

- (1) Municipal planning:
 - siting fish farm location within the framework of the municipal master plan
 - addressing traffic noise considerations at a detailed level within the framework of the municipal master plan
 - the town centre area plan in relation to internal environmental goals
 - enhancement of foot-paths
 - establishing bicycle lanes
 - implementing economic and other technical measures by farmers to reduce pollution from agriculture
 - a campaign for preventing accidents in playgrounds
- (2) Municipal services:
 - municipal monitoring and control of underground oil tanks
 - sewage treatment
 - waste management
 - environment education at Mære College of Agriculture
 - information on energy conservation
- (3) Municipal management, administration and operation:
 - management of indoor climate in a school building
 - County Bus Enterprise garage operation in relation to state pollution control regulations
 - municipal forestry in relation to internal environmental goals
 - post-graduate studies for ecology teachers as a subject in kindergarten and school
 - internal control activities in an institution's kitchen

Most of the audits focused on the system and identified different forms of system failure, like violation or lack of routines, deficient procedures and accountability, and lack of strategic policy. Most of the identified discrepancies were followed up by remedial action. These included items such as adjusting goals (both “reinforcement” and “weakening” from an environmental point of view), defining new goals, writing terms of reference, establishing new procedures for co-operation between public bodies, definition/modification of responsibilities within and between public bodies, implementing of new procedures, and adjusting procedures, etc.

The audit follow-up took either an “administrative” or a “political” model. In the administrative model the follow-up was by co-operation between the chief officer and the audited party represented by the administrative level. In the political model the political bodies representing the audited party made specific decisions on remedial action. The normal situation to be audited, is that where the municipal administration carries out the work, and the state, the municipal politicians or a superior administrative body set the goals. Some of the tests show however that the auditing process lead to close contact with municipal policy making. This happened when the audit was set up to assess how applications for exemptions were handled, i.e., to assess in what degree the decisions on exemptions from the municipal master plan reflected earlier guidelines and superior goals.

Some possible traps and difficulties with using the eco-audit tool have been identified in the project. These include the following:

- municipal officials may not immediately appreciate benefits resulting from an audit
- managers experience difficulty in implementing audits
- eco-audits require considerable input of resources (varying from 80-200 man-hours for the audit procedure itself — not including the follow-up procedures)
- audits may lead to only focusing on “doing things right”, at the expense of considering “whether we are doing the right things”
- audits may lead to only focusing on what people do, and neglect the underlying system
- the potential of “over focusing” on the chosen subject through the audit
- the potential for “over-measuring” the tasks which can be expressed in tangible data
- the problem of bureaucratization
- the problem of producing symbols instead of real information

The possible environmental benefits of eco-auditing can be only indirect and often difficult to document. The reason is that the tool is limited to data collection, and does not have a direct guidance function. Benefits are only generated when the system discusses the findings, and if the findings are followed up by remedial action which are “good for the environment” at a later stage. The picture of possible benefits becomes more clear by looking at how the environmental work is influenced. Municipalities that

used the eco-audit tool may benefit in the following ways:

- increase their capacity for more effective ways of management by objectives for municipal environmental work
- increase their ability for responding to the increasing demands to document compliance with national environmental standards
- obtain better insight and documentation of municipal environmental work
- improve the quality of municipal environmental work
- raise the level of awareness on environmental issues
- clarify municipal responsibility for environmental issues

Local Agenda 21 placed sustainable development on the agenda at the local level. Sustainable development is something more than the traditional concept of nature conservation and environment protection. In the perspective of sustainable development first drawn up by the World Commission, the eco-audit tool may contribute in delivering more sustainability in the following ways:

- encourage municipalities to shift from an “effect-oriented” to a “cause-oriented” environmental policy, by asking the question “why” when the audit identifies a discrepancy between environmental goals and achievements
- promote development of environmental (or sustainability) indicators, and subsequently to test the indicators
- increase public understanding of how the municipality can and actually does influence the environment, and thereby encourage more active public participation
- it might strengthen the position of the local government as compared with state initiatives (so far — at least in Norway — the eco-audit tool has only been tested as an internal management tool within local government)

The project has not produced evidence for making substantial deviations from the methodology in existing standards for conducting eco-audits. The municipalities are most likely to adjust the eco-audit tool. Municipalities may perceive the potential benefit of eco-auditing, when they become more acquainted with the tool. By then, municipalities will also be in a position to adapt the tool to their local needs. It is expected eco-auditing in Norwegian municipalities will increase, in most cases probably as an “in-depth” evaluation tool in addition to existing more general evaluation tools.

Eco-auditing may not become the type of tool for developing international guidelines, trying to describe the status for the whole range of environmental responsibilities at one time combined with an assessment of the local state of the environment. Discussing eco-auditing at an international scope would be too general to create political interest at the municipal level. In Norway the preconditions for local governments to take full advantage of the eco-audit tool are:

- a sufficient commitment from the top administrative and political level
- the willingness to prioritize environmental goals as superior goals within the framework of the municipal master plan, and at the concrete level of action within the organization
- the willingness to implement a systematic approach and document managing environmental issues
- the willingness to learn
- sufficient existing information of the local state of the environment

Evidence indicates the eco-auditing project contributes to creating an institutional capacity for conducting assessments. Both politicians and municipal officers comment they have learned much from participation in the project. Since the project ended in the fall of 1996 many municipalities have initiated independent, self administered eco-audits. In addition the information obtained from 20 eco-audits, and the procedures used to conduct them is documented and available as a resource for interested parties.

Policy Analyses for Sustainable Development

A project for municipal policy analysis to assess sustainable development has just been implemented. The project has three objectives: 1) to develop policy analysis tools for assessing sustainable development, 2) to develop a system for applying the precautionary principle, and, 3) to develop strategic environmental impact analyses as an instrument for environment protection.

In 1993 the Norwegian Local Authority Association (NLA) recommended to the ad-hoc-committee for environmental protection the following:

- NLA has to contribute to the elaboration of a standard for municipal policy analysis for sustainable development
- NLA has to contribute to explain the “municipal contents” in a precautionary policy and polluter-pays-principle

In the latter case, it is intended to put selected parts of the *Oslo Declaration on Environment, Health and Lifestyle* in concrete terms for use in municipalities and county municipalities. The NLA requests municipalities and county municipalities to work according to the standard for municipal policy analyses. The standard is regarded as an important instrument for the encouragement of local sustainable development.

Policy analyses are defined as belonging to the framework of strategic environmental impact analyses, that is, impact analyses at the political, program and planning level (so-called 3P-impact analyses). The terminology is used internationally. Several international conventions and declarations strongly encourage the countries to integrate this kind of analysis in their national environment protection efforts. The analyses are presented as important measures for the transition from effect-oriented to cause-oriented or preventive environment policies. Several countries have produced regulations, including Denmark and the Netherlands. A first initiative has also been taken in Norway. However, all these analyses are limited by focusing on national scopes.

Policy analyses distinguish themselves in some respect from strategic environmental impact analyses. They do not comprise all environmental impacts, but are focused on key issues of sustainable development. They are more goal-oriented than usual impact studies. Additionally, the policy analyses take long-term perspectives. Consequences for future generations, and not only short term impacts, are the main focus. Furthermore, they are oriented towards dealing with uncertainty about substantial and/or irreversible environmental consequences.

These attributes make policy analyses a suitable tool for the application of the precautionary-principle. The form of uncertainty described here is exactly the basic dimension of the principle. Uncertainty based on concrete reasons is a sufficient condition for the implementation of environmental regulations. The main goal of policy analyses is to evaluate in how far the suggested politics, program, plans and projects set positive or negative impulses for sustainable development.

Policy analysis can also be linked with the term “direction”. Analyses can produce qualified appraisals of the direction development takes with regard to central dimensions of sustainability.

Multiple policy analysis is feasible. However it is a challenge to undertake a comprehensive analysis that would address all the consequences that are relevant for “sustainable development”.

Another distinction is that policy analysis does not intend to produce a complete analysis of all types of environmental consequences. This con-

tains the most important difference vis-à-vis common forms of strategic environmental impact analyses and environmental impact analyses in general. Policy analyses start from a few selected key dimensions in sustainable development. Examples for those may be:

- What are the consequences with regard to total energy consumption (i.e., the sum of direct and indirect energy consumption)?
- What are the consequences with regard to the use of fossil (non-renewable) energy resources?
- What are the consequences with regard to transport generation and use of transport services?
- What are the consequences with regard to total consumption of resources (direct and indirect)?
- What are the consequences with regard to the loss of biodiversity-diversity?
- Are the suggested environmental measures effect- or cause-oriented, in other words: can environmental measures be called preventive?

In the context of the application of the precautionary-principle, it is crucial to consider the following aspect: What kind of risk is there for substantial or irreversible environmental effects and what kind of reasonable uncertainty (based on good reasons) is there with regard to the know-how basis for the evaluation of such risks?

The first phase of the project will produce a clear distinction and specification of this kind of key question. It is important to set up simple and clear structures. In many cases, this may imply qualitative evaluations. The strategic dimension must prevail.

In undertaking these analyses it is more important to deliver inaccurate answers to the right questions than precise answers to the wrong questions. This means that there is no need for the use of detailed indicator systems. Neither is there a need for environmental or sustainability goal setting at the local level or new statistics on the relation between types of activity and consumption of energy and other resources. It is strongly believed that actors in the process have the necessary basic knowledge to ask the right questions as well as the ability to give correct answers.

The project has two main objectives:

- to develop policy analyses as an instrument for sustainable development in municipalities and county municipalities
- to develop a system for the application of the precautionary principle in municipalities and county municipalities

By this, the project will, at the same time, serve as a basis for a third objective:

- to develop strategic environmental impact analyses as an instrument for the environment protection measures in municipalities and county municipalities

The project comprises the following main parts:

- definition of requirements for policy analyses at the municipal and county municipal level, including requirements when applying the precautionary principle
- testing a system with policy analyses in selected municipalities and county municipalities

An expected outcome of this project is to enhance municipal capacity for conducting assessments. The following municipalities participate in the project: The County of Akershus, the County of Hordaland, the City of Stavanger, the City of Bergen and the City of Ålesund. The project will conclude by the end of 1997.

Linkages with other Assessment Principles

Agenda 21 calls for action at the local level. Norway has responded to that request. The Norwegian municipal experience demonstrates eco-auditing and policy analysis are tools that contribute to assessing progress toward sustainable development. Audits and policy analysis help shift the focus towards cause oriented policies. The audits and policy analyses conducted in the municipalities clearly raise the capacity of local governments to assess progress toward sustainable development.

These initiatives encourage local authorities to consider municipal functions within a larger environmental context. This ties to the second principle, a holistic perspective. The Norwegian municipal eco-audits also illustrate a practical focus, described by the fifth principle: they stress cause-oriented assessments and comparisons between explicit, limited issues and indicators, and generate clear signals to decision makers. Auditing helps municipal organizations understand how judgements,

assumptions and actions within political, administrative, and regulatory settings influence outcomes. This ties to the sixth principle, openness.

References

- 1 Hams, T. (1994): *Local environmental policies and strategies after Rio*. In: Agyeman, J. og B. Evans (ed.): *Local Environmental Policies and Strategies*. Harlows, Longman.
- 2 Tuxworth, B. (1996): *From Environment to Sustainability: survey and analysis of Local Agenda 21 process developed in UK local authorities*. In: *Local Environment*, Vol. 1, 3/96:277-299.
- 3 Bukve, O. 1993. *Municipal administration and planning (Kommunal forvaltning og plannlegging)*. Oslo: Samlaget. In Norwegian.
- 4 Kleven, T. (1993): *An Essay on Research and Management by Objectives*. ("Sørensens konklusjoner". Et essay om forskning og målstyring). Rapport 1993:1. The Norwegian Institute of Urban- and regional research. Oslo. In Norwegian with English summary.
- 5 The Ministry of The Environment (1991): *Government White Paper on municipal environmental protection*. ("St. meld. nr.34. Om miljøvern i kommunene"). Oslo. In Norwegian.
- 6 Aall, C. (1997b): *The summing-up of the Eco-municipality programme 1989-96*. (Oppsummering av økokommuneprogrammet 1989-96). VF-rapport. Western Norway Research Institute, Sogndal. In Norwegian with English summary.

Where to from Here?

Peter Hardi and Terrence Zdan

IISD's collaborative work in documenting these case studies is intended to illustrate practical application of a set of principles for assessing progress toward sustainable development. Collectively they provide a rich and engaging testament that the Bellagio Principles for Assessment are being put into practice. The stories describe pragmatic, real world experiences of businesses, organizations, governments and the public striving to critically think about substantive content and fair process as they go about developing rigorous and methodologically sound assessments of progress toward sustainable development.

A number of observations arise from a review of the case studies.

Firstly, they collectively signal a remarkably high interest around the world in learning about progress through indicators, targets, and reports. Measuring progress in this way may be creating and nurturing a world wide acceptance for assessment. Knowing how well social, economic, and environmental conditions are by measuring and monitoring key indicators is like a doctor keeping track of a patient's vital health signs, or an accountant keeping good books. More and more people are recognizing the advantages of keeping such records consistently and regularly.

Secondly, the case studies suggest that the effort to assess progress is more pervasive than might be expected and perhaps analogous to Adam Smith's "invisible hand." Critics may argue the effort to monitor and assess sustainable development is expensive and unwarranted. But these case studies demonstrate that assessing progress increases knowledge and understanding of the complex world around us.

Thirdly, the case studies show that successful assessment doesn't just happen and after start-up, cannot simply be left to itself. Throughout, committed, even inspired, leadership is critical. In any given situation, a country, business, region, citizens group, or administration, may require a convincing push toward doing assessments. This may originate from external forces, such as public demands or dissatisfaction. However, it is always more effective when it begins with internal stimulus: strong leadership and long-term vision.

Fourthly, the case studies suggest that assessing trends toward progress in human and ecological well-being inevitably leads to identification of practical steps for improvement. These steps can find application in a broad range of activities that might be social, economic, or environmental in nature. As a tool for policy analysis, assessments will help to identify potential system weaknesses and provide early warning signals that indicate the need for policy changes, shifts in behaviour, or institutional adjustments.

Fifthly, a key message the case studies convey is their dependence on good quality data. In order to truly commit to knowing the direction and degree of progress toward sustainable development, information systems need developing and maintaining. Indicators needed for assessing progress may be constrained by a lack of data, few resources to monitor, or an inability to analyze or interpret the data. Successful assessments come from institutions that have a capacity to manage, analyze, and synthesize data and communicate the results.

Lastly, the case studies show that even when all the indicators are compiled, there remains a difficult challenge in drawing out the meaning of the changes that are suggested. Trends can be contradictory, different values might lead to different weighting or an alternative interpretation of the same data. We are only beginning to come to grips with how best to deal with this process of judgment.

Assessing progress in the way suggested by the *Bellagio Principles for Assessment* leads to a result that has many benefits. By utilizing an open, transparent and collaborative assessment process, the opportunities for learning are maximized and a broad base is created for finding the resources and implementing the required solutions. By identifying trends that are not sustainable, crises can be avoided. By providing insight regarding needed actions, more effective strategies for change can emerge, whether for a business, local government, or a nation. In some cases the issue of survival may be at stake whether it be in the economic sense of a business, or more dramatically when human life is implicated. As experience is gained, these benefits will become more evident and the result will dictate future trends in developing and maintaining systems of indicators of sustainable development.

The *Bellagio Principles for Assessment* are the first version of formulating the scope and content of assessment criteria for sustainable development. They were developed in a spirit of collaboration among an extended audience. The merit of the principles will be based on their ability to capture vital components for assessing progress. They will be revised as new considerations arise.

The selected case studies are only a fraction of many more experiences that have been conducted, are ongoing, or being designed around the world. IISD is interested in extending its network of researchers and practitioners engaged in assessment activities. We are also interested in reader's feedback and comments. Please contact us.

IISD

161 Portage Avenue East, 6th Floor
Winnipeg, Manitoba Canada R3B 0Y4

Tel: 1-204-958-7700

Fax: 1-204-958-7710

e-mail: info@iisd.ca

Contributors

Carlo Aall is a researcher at The Western Norway Research Institute. He is studying for a Ph.D. on Municipal Environmental Auditing at the University of Aalborg.

Jan Bakkes is project leader of the activities in support of UNEP and head of the Global Environment Assessments division at the National Institute of Public Health and the Environment (Rijksinstituut voor volksgezondheid en milieu (RIVM)) in the Netherlands. Previously he worked with the World Bank's indicator team and on RIVM's integrated assessments program.

Richard Conlin was a cofounder of Sustainable Seattle and leader of the Indicators Task Team. He is currently consulting on sustainable development and indicators through his firm, Conlin and Associates.

Peter Hardi is a Senior Fellow and Director of the Measurement and Indicators Program at the International Institute for Sustainable Development, Winnipeg, Canada. He organized the international conference that developed the Bellagio Principles for Assessment in 1996.

R. Anthony Hodge is an independent consulting engineer based in Victoria, British Columbia. He is also currently Chair of the British Columbia Council for Sustainability.

Karl Georg Høyer is now a research leader in the Department of Environmental Science at the Western Norway Research Institute after fulfilling his role as the Managing Director.

Jochen Jesinghaus works at Eurostat, the Statistical Office of the European Union. Eurostat is developing a system of 10 Environmental Pressure Indices, helped by more than 30 related projects carried out by National Statistical Offices and research institutes.

Alex MacGillivray coordinates a program on new indicators of sustainable development and quality of life at the New Economics Foundation (NEF) in London. NEF is a research, training and advocacy not-for-profit organization set up in 1986 to build a just and sustainable economy.

Adil Najam, based in Pakistan, is a member of an international team of experts for the IUCN/IDRC Project on Assessing Progress Toward Sustainability. He is an Assistant Professor of International Relations and of Energy and Environment at Boston University.

Michael Narodoslowsky is an Associate Professor at the Institute of Chemical Engineering, Graz University of Technology, Graz, Austria. He is also a member of the board of directors of SUSTAIN, a national research association aimed at coordinating and stimulating research on sustainability.

Kara Palmer has been the Program Director for Sustainable Seattle. She was also the designer and production manager for curricula on sustainability and for the Indicators of Sustainable Community 1995.

Takis Plagiannakos is a Senior Corporate Planner, Corporate Strategies, with Ontario Hydro in Toronto, Canada. His responsibilities include undertaking research on strategic planning and developing corporate performance measures.

Adrian G. Rodriguez is a Senior Advisor to the Minister of National Planning of Costa Rica on Sustainable Development and Environmental Economics. He is the Executive Secretary of the Costa Rican Sustainable Development National Council and Coordinator of the National System for Sustainable Development.

Mark Skuce is a Corporate Planner, Corporate Strategies, with Ontario Hydro in Toronto, Canada. His responsibilities include developing, implementing and reporting sustainable development indicators.

Jaap van Woerden is responsible for the management of global and regional data for the integrated assessments program at RIVM. As such he also participates in various international data networking initiatives.

Terry Zdan is a consultant specializing in interdisciplinary economic, social, and environmental strategic management and problem solving. He works out of Winnipeg, Canada.

INDEX

A

acidification, 55, 57, 60
adequate capacity for assessment, 24
Advisory Commission on Biodiversity, 30
Agenda 21, 8, 26, 28, 30, 32, 108, 144, 146, 149, 153
auditing, 8, 24, 85, 143, 145, 146, 147, 148, 149, 150, 153
audits, 145, 146, 147, 148, 153
Austria, 8, 67, 68, 72, 73, 74, 94
Austrian National Statistical Bureau, 68
availability of data, 20

B

barbecues, 112
Barometer of Sustainability, 38, 44, 47, 48, 51, 136, 140
baseline, 62, 91, 123
beef, 73, 75.
Bellagio, 1, 7, 12, 14, 24, 35, 51, 76, 137, 138, 143, 155, 156, 157
benchmarks, 80
Best Available Technology, 57
Bezirk, 68
British Columbia, 7, 37, 38, 39, 44, 45, 46, 47, 48, 51, 52
broad participation in assessment processes, 22
Brundtland Commission. See World Commission on Environment and Development
Brundtland Report, 27, 94
Bullitt, Kay, 118
'business-as-usual' scenario, 53, 54

C

capacity building, 55
categories of data and information, 14, 15
cause-effect, 17, 19
Civic Panel. See Sustainable Seattle Civic Panel
climate change, 30, 55, 60, 62
COABIO. See Advisory Commission on Biodiversity
Colombia, 129, 131, 136, 140
Commission on Resources and Environment, 38, 39
communicating information, 105
Community Indicators Resource Pack, 105, 113
community theatre, 112
comparative assessment, 11
competitiveness, 26, 80, 81, 84, 91
composite indicators, 8, 86, 88, 89, 90, 91
CONADES. See National Council on Sustainable Development
conceptual framework, 14, 52, 130
Conservation Strategy for Sustainable Development, 27
continual assessment, 23
continuing reflection, 13
Conventional Development, 56, 57
conversion, 55, 81
CORE. See Commission on Resources and Environment
core indicators, 100, 143
Corporate Performance, 77, 85, 86, 91
Costa Rica, 7, 25, 26, 27, 29, 30, 31, 32, 34, 35
CP. See Corporate Performance
culture of assessment, 133

D

- DA. See Development Alternatives
- DALEs. See Disability-Adjusted Life Expectancy years
- data for integrated environment assessment, 62
- DEAP. See District Environmental Action Plan
- Development Alternatives, 130, 137
- Development of Reflective Capacity, 135, 137, 139
- Disability-Adjusted Life Expectancy years, 56
- disparity, 17, 18, 44, 53
- distribution of costs and benefits, 17
- District Environmental Action Plan, 137
- District Environmental Action Plans, 137

E

- Earth Summit. See United Nations Conference on Environment and Development
- eco-audits, 143, 146, 148, 149, 150, 153
- ECODES. See Conservation Strategy for Sustainable Development
- eco-efficiency, 80, 87
- ECOFIT. See Ecological Region Feldbach with Integrated Technology
- ecological footprint, 8, 70, 71, 76, 116
- Ecological Region Feldbach with Integrated Technology, 67, 68
- economic instruments, 29, 94
- ecosystem, 7, 12, 13, 15, 16, 17, 18, 19, 37, 40, 42, 43, 44, 48, 51, 67, 73, 132, 133, 134, 135, 136, 144
- ecosystem well-being, 37, 40, 42, 44, 51, 133, 135, 136
- EDP. See Environmentally Adjusted Domestic Product
- egg of sustainability, 132
- emissions of contaminants, 19
- empowering, 105

- energy, 42, 43, 48, 56, 57, 61, 72, 79, 80, 81, 83, 84, 86, 87, 94, 99, 100, 117, 119, 122, 147, 152
- engaging techniques, 116
- Environment and Resource Programmes, 145
- Environmental Impact Assessment, 64
- environmental management system, 145
- Environmental Performance Composite Indicator, 87
- Environmentally Adjusted Domestic Product, 94
- equity, 17, 18, 27, 28, 29, 44, 53, 64, 75, 76, 84, 118
- ESEPI. See European System of Environmental Pressure Indices
- European Commission, 93, 94, 125
- European Community, 69
- European System of Environmental Pressure Indices, 95, 97, 101, 102
- European Union, 8, 93, 94, 97, 98, 99, 101, 103
- evolutionary capacity of the ecosystem, 42
- expert groups, 93

F

- Feel-Good Factor, 106
- Feldbach, 67, 68, 69, 70, 71, 72, 73, 74, 75
- Figueres, President of Costa Rica, 26
- First Global Environment Outlook, 53, 65
- Forest Law, 29
- Forest Protection Certificate, 29
- fossil fuel, 30, 79
- Foundation for Co-operation on Sustainable Development, 32
- framework, 8, 14, 15, 20, 25, 27, 35, 40, 52, 58, 60, 64, 66, 77, 79, 80, 84, 85, 86, 90, 91, 101, 130, 135, 136, 139, 147, 150, 151
- full life cycle, 17

- Fundacion Pro-Sierra Nevada de Santa Marta, 136, 140
- future generations, 11, 13, 14, 18, 19, 53, 64, 67, 118, 151
- G**
- GDP. See Gross Domestic Product
- GEO-1. See First Global Environment Outlook
- German Development Agency, 136
- Global Environment Outlook, 7, 53, 54, 65
- Global Forum, 125
- Global Tomorrow Coalition, 118
- GNP. See Gross National Product
- Greenhouse Warming, 97
- Gross Domestic Product, 11, 12, 42, 46, 48, 49, 50, 94
- Gross National Product, 11
- GTC. See Global Tomorrow Coalition
- GTZ. See German Development Agency
- H**
- hierarchy, 41
- holistic perspective, 16, 17, 18, 76, 138, 153
- Huff, Darrell, 109
- human development, 27
- human well-being, 37, 38, 41, 44, 51
- human-ecosystem, 14, 18
- Hungary, 69, 125
- hydroelectric stations, 79
- I**
- ICLEI. See International Council for Local Environment Initiatives
- IDRC. See International Development Research Centre
- IISD. See International Institute for Sustainable Development
- IMSD. See Integrated Mission for Sustainable Development
- 3P-impact analyses, 151
- Index of Sustainable Economic Welfare, 42, 46
- India, 8, 55, 56, 129, 131, 136, 137
- Indicators of 117, 118,
Sustainable Community, 120, 122, 124, 125
- Indicators of Sustainable Development, 30, 31
- indigenous energy sources, 83
- INFODES. See National Commission on Information for Sustainable Development
- Institut für Verfahrenstechnik, 68
- institutional capacity, 26, 35, 138, 143, 150
- institutional framework, 25, 35
- Institutional Implementation Capacity Assessment, 135, 139
- integrated assessment, 54, 60
- integrated environmental assessment, 65
- Integrated Mission for Sustainable Development, 137
- interest groups, 32, 39
- Intergovernmental Panel on Climate Change, 97
- internal control system, 145
- International Council for Local Environment Initiatives, 144
- International Development Research Centre, 129, 130, 131, 137, 138, 139, 140
- International Institute for Sustainable Development, 12, 127, 155, 157
- international trade, 18
- International Union of Local Authorities, 144
- INTERNET, 31
- IPCC. See Intergovernmental Panel on Climate Change
- iron curtain, 69, 70, 72
- ISEW. See Index of Sustainable Economic Welfare
- IUCN. See World Conservation Union
- IULA. See International Union of Local Authorities

K

Key Results Areas, 85, 86
KRAs. See Key Results Areas

L

land naturalness index, 42, 47
launch events, 112
Lawrence, Gary, 111
learning and reflective stance, 17
LFA. See Logical Framework Analysis
life expectancy, 27, 46, 56
literacy, 27
local knowledge, 107
Logical Framework Analysis, 136, 137, 140
long-range, 19
long-term, 13, 18, 22, 85, 86, 87, 88, 89, 91, 94, 111, 117, 118, 119, 120, 125, 151

M

manure, 73, 75
Map Maker, 136, 140
master planning, 143
McLuhan, Marshall, 109
meat consumption, 56
MEGO syndrome, 111
MIDEPLAN. See Ministry of National Planning and Economic Policy
mining, 50, 68
Ministry of National Planning and Economic Policy, 27, 30, 33
model-based, 53
models, 14, 16, 55, 60, 62
monetary and non-monetary forms of valuation, 17
monitor, 8, 11, 40, 51, 80, 85, 114, 140, 155, 156
monitoring, 7, 11, 23, 64, 79, 80, 95, 130, 131, 133, 135, 136, 137, 140, 147, 155
multigenerational, 18
multiple capital, 14
Municipal Eco-Auditing, 143

N

NAS. See National Assessment System
national accounts, 11, 95
National Assessment System, 32, 33
National Commission on Information for Sustainable Development, 31
National Conservation Strategies, 130
National Council on Sustainable Development, 32
National Development Plan, 27, 30
National Development Strategy, 25, 26, 27, 28
national income, 11
National Institute of Public Health and the Environment, 54, 60, 62, 63, 65
National Poverty Alleviation Plan, 29
National System for Sustainable Development, 30
needs, 13, 14, 15, 17, 19, 21, 22, 28, 33, 58, 64, 67, 83, 86, 90, 101, 105, 109, 110, 118, 134, 137, 138, 149
NEF. See New Economics Foundation
New Economics Foundation, 105, 109, 111, 113, 114, 116
nitrogen, 47, 75
Norway, 144, 145, 146, 149, 150, 151, 153
nuclear, 79, 88
nutrition, 74, 75

O

ongoing assessment, 8, 138, 140, 141
Ontario Hydro, 8, 77, 78, 79, 80, 81, 84, 85, 86, 87, 88, 90, 91
openness, 97, 102, 103, 126, 154
Oslo Declaration, 144, 151
Ozone Depletion, 97, 98

P

Participatory and Reflective Analytical Mapping, 135, 137, 140
participatory reflective process, 22
performance scale, 44
policy analysis, 150, 151, 153, 156

policy targets, 58
 political commitment, 34
 population, 18, 26, 27, 30, 35, 38, 41,
 44, 45, 48, 53, 56, 57, 58, 109,
 113
 pork, 68, 73, 74, 75
 potatoes, 73
 poultry, 73, 74
 poverty, 15, 18, 25, 27, 28, 39, 41, 45,
 53, 59, 75, 112, 125, 144
 PRAM. See Participatory and Reflective
 Analytical Mapping
 precautionary principle, 80, 150, 153
 Prescott-Allen, Robert, 44
 pressure-state-impact-response, 60
 priority setting, 53
 Programme on Strategies for
 Sustainability, 129, 130
 project assessment, 137, 141
 provincial strategy for sustainable land
 use, 38
 public health, 28, 29
 public participation, 8, 26, 28, 39, 120,
 127, 149
 public sector, 7, 30, 145

Q

quality of life, 26, 108, 114, 125, 131
 questionnaire surveys, 93

R

Redefining Progress, 127
 regional analysis, 49
 region-specific assessment studies, 57
 region-specific integrated models, 53
 reliability, 141
 renewable energy, 80, 83, 84
 reporting, 8, 11, 24, 27, 39, 54, 65, 79,
 80, 84, 85, 131
 Resource Use Efficiency Composite
 Indicator, 87
 restructuring, 7, 24, 26, 28, 67, 75,
 135, 137
 results-based management, 11
 Rifkin, Jeremy, 106

Rio de Janeiro, 11
 RIVM. See National Institute of Public
 Health and the Environment
 Rockefeller Foundation, 12
 rural sustainability, 135, 137, 140

S

SAGs. See Scientific Advisory Groups
 salmon, 48, 108
 scaling, 38, 44, 51
 scenario analysis, 55, 56, 57, 59, 60
 Scientific Advisory Groups, 98
 scope, 7, 19, 35, 46, 54, 55, 60, 64, 70,
 71, 72, 73, 74, 75, 76, 146, 150,
 157
 SDI. See Sustainable Development
 Indicators
 Seattle, 8, 108, 109, 112, 117, 118,
 119, 120, 121, 122, 123, 124,
 125, 126, 127
 SED. See Sustainable Energy
 Development
 self-assessment, 134, 135
 self-help guide, 8, 113
 SIDES. See System of Sustainable
 Development Indicators
 simplicity, 22, 105, 109
 SINADES. See National System for
 Sustainable Development
 SIs. See Specialized Institutes
 snapshot, 123, 125, 140, 141
 social choice, 13
 social reforms, 25
 spatially detailed models, 62
 Specialized Institutes, 98
 specificity, 109
 stakeholder, 64
 2002 State of the Environment Report,
 54
 stewardship, 86
 stimulation, 109, 111
 Stockholm Environment Institute, 63
 Strategic Negotiation for Community
 Action, 135, 137
 stress-response, 14

Strong, Maurice, 79
 structural change, 53, 57
 subsistence, 38, 40
 sustainable development actions for indigenous peoples, 31
 Sustainable Development Indicators, 30, 77, 79, 80, 85, 86
 Sustainable Energy Development, 79, 80, 85, 86, 87, 88, 91
 Sustainable Process Index, 72
 Sustainable Seattle, 8, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127
 Sustainable Seattle Civic Panel, 119, 120, 121, 122, 123
 System Analysis and Planning, 135, 137
 system assessment, 17, 135, 136, 137, 141
 System of Sustainable Development Indicators, 25, 30, 31
 Systematic Analysis of Experience, 135, 139
 systems theory, 16

T

The Plan for Equality of Opportunities between Men and Women, 29
 three letter acronyms, 111
 time frame, 54, 67, 69, 70, 71, 72, 76, 88
 time horizon, 18, 19, 67
 TLAs. See three letter acronyms
 transparency, 8, 19, 22, 44, 93, 102
 transport, 19, 94, 99, 152
 Treaty of Rome, 94

U

uncertainty, 23, 44, 72, 129, 133, 151, 152
 underground economy, 42, 47
 UN-DPCSD. See United Nations Department for Policy Coordination and Sustainable Development

UNEP. See United Nations Environmental Programme
 UNIDESOs, 30
 United Nations Centre for Human Settlements, 125
 United Nations Conference on Environment and Development, 11, 14, 28, 120
 United Nations Department for Policy Coordination and Sustainable Development, 27
 United Nations Environmental Programme, 7, 53, 54, 58, 59, 60, 62, 63, 65, 130
 United Nations University, 62
 United States Environmental Protection Agency, 124
 unpaid household work, 42, 47
 US President's Council on Sustainable Development, 125
 utilities, 78

V

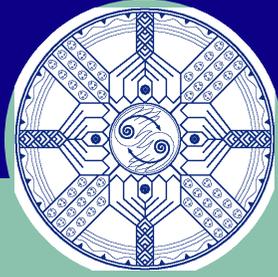
value added, 42
 value-driven principles, 15

W

waste, 28, 42, 45, 48, 71, 81, 87, 88, 95, 100, 116, 145, 147
 Western Norway Research Institute, 144
 World Commission on Environment and Development, 11, 13, 118
 World Conservation Union, 8, 129, 130, 131, 137, 138, 139, 140
 World Wide Fund for Nature, 108, 113, 116, 130
 World Wide Web, 25, 31, 33, 34, 54, 57, 65, 112, 130
 WWF. See World Wide Fund for Nature
 www. See world wide web

Z

Zimbabwe, 129, 131, 136, 137, 140



IISD: Knowledge into action

For our farms, businesses, homes and lifestyles, business as usual is no longer an option. Each must become more sustainable, which means they must help improve economic efficiency, protect and restore ecosystems, and enhance the well-being of all peoples.

IISD's mission is to promote sustainable development in decision-making, internationally and within Canada. We contribute new knowledge and concepts, analyze policies, identify and disseminate information about best practices, demonstrate how to measure progress, and build partnerships to amplify these messages.

IISD is now the world's leading Internet hub for sustainable development knowledge. Through its new Spinning the Web project, the Institute is working with key partners around the world to build knowledge networks for decision-makers from the village to the boardroom.

IISD is helping move sustainable development from concept to practice. We are working in rural Africa and in Chinese cities, in industrialized countries and in nations in transition to market economies, sharing experiences and building bridges.

IISD's Earth Negotiations Bulletin makes international conferences more open and understandable. Our homepages, IISDnet and Linkages, provide thousands of users on every continent, each hour around the clock, with information for sustainable development.

The Institute is spearheading global efforts to develop accurate measurements of progress towards sustainable development. We are monitoring and influencing global trade negotiations, and working to promote more sustainable livelihoods in our home eco-zone in the Manitoba prairies.

IISD is an independent not-for-profit corporation headquartered in Manitoba, Canada, with partners and associates throughout the globe. It is funded by Canadian and international sources, and from the sale of products and services.

Phone: 1-204-958-7700; Fax: 1-204-958-7710

Email: info@iisd.ca

IISDnet: <http://iisd1.iisd.ca/>

Linkages: <http://www.iisd.ca/linkage/>