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Advancing Sustainable Development in Canada

Policy issues and research needs

November 2003



PRI Project Sustainable Development

in collaboration with

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Canada

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**PRI Project
Sustainable Development**

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Preface

Sustainable development (SD) is more than ever a major policy issue for countries around the world. Climate change, the loss of habitat and biodiversity, stresses on freshwater, and severe social and environmental problems in cities are among the challenges facing most countries. But beyond climate change, to which the Canadian government has already begun to respond through the ratification of Kyoto, what are the most pressing issues facing the country? What knowledge gaps remain in our understanding?

To address these questions, the Policy Research Initiative (PRI) and the International Institute for Sustainable Development (IISD) have drawn on extensive expertise, both domestic and international, to identify the major SD challenges for Canada.

The PRI is committed to providing the federal government with policy research on major crosscutting issues facing Canada. Over the past year, the PRI's policy research work on SD has followed two broad tracks. The first involves identifying priority SD issues facing Canada; the second is identifying principles, indicators, instruments, and institutions for achieving SD. This paper, *Advancing Sustainable Development in Canada: Policy Issues and Research Needs*, represents the culmination of the first research track.

Since 1990, the IISD has been examining a broad range of SD issues at community, regional, national, and international levels. Through its track record of innovative projects, the Institute is respected around the world for its leading-edge SD policy work. In March 2003, the PRI commissioned the IISD to write a paper on the core SD issues that go beyond climate change.

The seven key SD issues facing Canada explored in this paper are the need to bring about changes in the way cities are designed and planned, improving the quality and management of Canada's freshwater resources, engaging in cross-jurisdictional, eco-region level decision making, understanding the impacts of globalization on SD in Canada, designing signals and incentives that induce sustainable behaviour among citizens and the private sector, reducing the ecological burden of current lifestyles, and taking bolder steps in meeting international commitments related to the alleviation of poverty in the world.

While each issue identified in this paper presents its own unique challenges, some common elements emerge: the need to develop indicators against which progress can be measured and different policy options and instruments can be evaluated, the need to identify crosscutting strategies that work, and the need to better understand the institutional and governance frameworks, which can provide the federal government with the leverage needed across departments and in society to further Canada's SD objectives.

We would like to extend our most sincere thanks to all the contributors to this paper: the IISD staff for sustained, high-quality work, the PRI staff for guidance and comments throughout the process, and the interdepartmental community for constructive comments. Two individuals deserve special thanks: Pearl Eliadis, Senior Research Director at the PRI for her intellectual engagement and leadership in this project and Marlene Roy, from the IISD, for coordinating and drafting this document under challenging circumstances.

We hope this paper will serve as a starting point for, and give structure to, further research and debate on the issues and research needs facing SD policy-makers in Canada.

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Executive Summary

The World Summit for Sustainable Development held in September 2002 once again focused the world's attention on sustainable development and brought about renewed commitments from governments to implement Agenda 21, the program of action originally agreed to at the Earth Summit in 1992. Sustainable development is a broad and challenging agenda requiring a long-term vision that is adaptable as well as steadfast in its purpose. Moreover, governments are being called upon to guide national development and meet their international commitments in an environment of increasingly complex relationships.

This paper is the result of a Policy Research Initiative/International Institute for Sustainable Development exercise to identify and clarify issues of sustainable development of particular importance to Canada in the mid to long term. After much consultation, the seven issues described below were chosen based on their level of significance to Canadians and degree of importance to Canada in meeting its international sustainable development commitments. Though important, the issue of climate change was not considered at the request of the PRI. In recognition of the highly complex and fluctuating environment in which research and policy take place, the selected issues have been framed so the linkages between them can be readily identified, yet they are discrete enough to allow priorities to be developed.

A. Urban Redesign

Urban infrastructure is the physical manifestation of cultural and social values. This infrastructure demonstrates the underlying problems of urban form, which is becoming increasingly mal-adapted to the needs and activities of today and the future. The challenge is to bring about change in the way cities are designed and planned so they support the sustainability of the larger-scale systems to which they are linked.

Quick Facts

- Seventy-nine percent of Canadians live in urban areas.
- Local decision makers have a great deal of influence on Canada's economic innovation and social cohesion.
- Canadian cities appropriate land areas many times their size according to their ecological footprint.
- Canadian cities are challenged by social problems, such as poverty and crime, and health problems associated with air pollution.

Research Needs

- Determine how to implement sustainable development goals of cities that address a broader range of quality-of-life issues.
- Identify factors that have led to successful change for sustainable development in cities.
- Investigate the mix of government and economic instruments that can advance urban sustainability.
- Research examples of success in other countries to provide insight into solutions for Canada.
- Review ways to strengthen the federal influence and input to sustainable urban planning.

B. Freshwater Management

Water scarcity and declining water quality is at a crisis point in many areas of the globe, driven by increasing competition for water resources by a growing population and per capita consumption levels. This issue is not about dealing with the global commons, but instead is rooted at the regional, national, and sub-national levels, and deals with supply, demand, and local conflicts. A strong global demand for investment in, and access to, clean water will have an impact on Canada, which has placed a high priority on water quality and is water rich.

Quick Facts

- Canada has almost 10 percent of the world's freshwater, less than one percent of the world's population and the second highest per capita consumption of freshwater.
- Many Canadian basins are affected by pollution from industrial and municipal runoff and airborne pollutants negatively impacting people and ecosystems.
- Water supplies are threatened by inefficient use allowing for unnecessary over-consumption.
- Globalization has already increased the demand for our agriculture exports, with consequent increased pressure on our domestic freshwater resources.
- Urgent matters include the ongoing drought in Western Canada, intensive livestock production, global warming melting glaciers, poor farm drainage practices, and overuse of chemical fertilizers.

Research Needs

- Investigate how to implement integrated freshwater management effectively.
- Develop common frameworks and understand how policy decisions taken at various levels of government are affecting individual watersheds.
- Determine how to leave enough water in ecosystems to provide a full range of ecological services.
- Develop full-cost pricing of water, including analysis of its distributional effects.
- Study the mix of rights, incentives, and administrative structures (e.g., conservation watershed management in Canada) to develop community capabilities for management of freshwater ecosystems.
- Study the cross-linkages and synergies with other important policy drivers.
- Examine the cumulative impacts of intensive livestock production.

C. Eco-Region Sustainability

Canada's several large eco-regions are suffering from habitat degradation and loss. This degradation exacts a toll in loss of ecosystem services and livelihoods. To make better decisions to advance sustainable development, we need to look at problems and solutions as they interact on the landscape and over time. This type of "place-based" decision making considers the eco-region and associated human activity in its entirety instead of taking a more traditional and narrower sectoral and/or jurisdictional approach. It does require, though, a well-developed set of analytical tools and understanding of how jurisdictional issues will play out.

Quick Facts

- The quality of life of Canadians depends on the health and wealth of ecosystems.
- Some areas of the country are at high risk (urban, agricultural, and some forest landscapes) and all habitats are at some risk due to such global issues as climate change, long-range transport of air pollutants, and the invasion of exotic species.
- Livelihoods are threatened. For example, the collapse of the cod fishery on the Atlantic coast resulted in 40,000 lost jobs.
- Flora and fauna are also threatened: the number of endangered species in Canada rose from 178 in 1988 to 415 in 2002. It should be noted, however, that this increase in species at risk is more representative of the capacity of the Committee on the Status of Endangered Wildlife in Canada to assess species than of the rate at which species are becoming endangered; many hundreds of species have not yet been examined.

Research Needs

- Carry out a comparative analysis of cases in which eco-region frameworks have been used as the basis for decision making.
- Advance our understanding of the key ecosystems and ecological structures required to sustain ecosystem services.
- Develop a proper valuation of ecosystem services and the institutions required for mediating conflicts when different social groups assign different values to these services.
- Identify new tools for managing at the eco-region level.
- Determine how various levels of government can link visions, goals, and policies at the scale of the eco-region.
- Define the legal, policy, and management arrangements for Aboriginal peoples.

D. Impacts of Globalization on Canada

Canada's trading status and involvement in various trade agreements is creating opportunities as well as vulnerabilities for Canada. National economies are becoming more and more integrated in a global economic structure, where all the elements needed to produce a final good or service – production of inputs, design, assembly, management, marketing, savings for investment – may be sourced from around the globe in a system held together by powerful communications, information, and transportation technologies. The trend toward globalization has been driven, in part, by these new technologies and, in part, by reduced barriers to international trade and investment flows. The result has been a steady increase in the importance of international trade in the global economy. The major institutional drivers for globalization have been trade agreements at the multilateral, regional, and bilateral levels.

The links between globalizing trends and sustainable development are multiple and complex; the major elements noted in this paper are:

- impacts on a state's ability to regulate in the interests of public policy objectives, such as a clean environment, human health and safety, health and education services, and others; and
- impacts of the increased flow of goods and services on the natural environment.

Quick Facts

- The trend toward globalization has been driven by new technologies and by reduced barriers to international trade and investment flows.
- The importance of international trade in the global economy has grown. In the last 50 years, while the global economy quintupled, world trade grew by a factor of 14.
- Canada, as a small and open economy, is as much a part of this phenomenon as any other developed country, with exports as a share of gross domestic product (GDP) growing from 26.5 percent in 1988 to 43.1 percent in 2002.
- The major institutional drivers for globalization have been trade agreements at the multilateral, regional, and bilateral levels.
- Policies that were once considered to be strictly domestic will increasingly have impacts on other countries.
- Rules of the World Trade Organization (WTO) have been reaching behind national borders to regulate the myriad domestic processes that can impede trade flows.

Research Needs

- Study the possible regulatory impacts of liberalization of services trade and investment.
- Analyze the prospect for regionalism to affect sustainable development.

E. Signals and Incentives

Monetary and non-monetary instruments are used to send signals to decision makers and guide their decisions. Two approaches to implementing sustainable development are using models and associated metrics of sustainable development, and internalizing externalities. There are questions about how these signals and incentives are developed, how flexible they are, who verifies them and how to use them to make intelligent decisions. The challenge is to develop and refine these approaches so they inform each other, thus enabling adaptation while linking them to overall policy objectives.

Quick Facts

- Signals and incentives are tools for advancing sustainable development that are important for moving forward and ensuring that we are making the right decisions.
- Economic signals are rarely linked to environmental signals in a direct way.
- Miscommunication between signals from the environment and incentives from the market can ignite dissension and prevent necessary adaptation from taking place in a timely way.

Research Needs

- Develop a framework that combines monetary and non-monetary instruments.
- Develop appropriate indicator frameworks for Canada at various spatial levels and set priorities for constructing the necessary data sets.
- Evaluate economic instruments and their applicability in relation to biodiversity and habitat conservation.
- Determine how to better communicate concepts and frameworks to the public.

F. Unsustainable Lifestyles

In a world of finite resources, Canadians are richly endowed. Indeed, many consider Canadian levels of per capita consumption unsustainable and inequitable. Shifting behaviours to more sustainable lifestyles, however, are proving difficult. From among the many instruments available to influence consumer choices, “moral suasion” is often used by government. Despite 30 years of environmental policy-making, we do not yet understand why individuals have not made the connection between long-term environmental damage and individual lifestyle – and have not acted accordingly. We need to learn more about the development of social instruments that will lead to changes in attitudes and behaviours.

Quick Facts

- Environmental impacts from household activities have worsened and are expected to intensify even more over the next 20 years.
- Canadians have one of the largest ecological footprints, estimated to be 7.7 ha/cap, with only the United States and Australia being higher.
- High levels of consumption can be linked directly or indirectly to a number of significant “danger signs” in our ecosystems, such as high levels of emissions and waste that exceed the ability of the earth’s sink capacities and growing degradation of renewable resources such as water, soil, forests, fish, and biodiversity, that undermines ecosystem integrity and livelihoods.

Research Needs

- Strengthen evidence-based research on the effectiveness of social instruments in the environment and sustainable development field.
- Investigate how sustainable development policy instruments can be combined more effectively.
- Carry out research on what motivates Canadians to change.
- Investigate communications and engagement approaches that stimulate collective responses.

G. International Engagement: Poverty and Sustainable Development

Poverty alleviation is a fundamental principle of sustainable development and a primary goal of the Millennium Development Goals and the World Summit on Sustainable Development Plan of Implementation, both having been endorsed by the United Nations. Canada, as a UN member and as part of its own foreign policy, has made several commitments to poverty reduction. The consensus is, however, that Agenda 21 and other well-intended international commitments made by Canada and other developed countries have not resulted in sustainable development paths in developing countries.

Quick Facts

- Poverty lies at the heart of resource access and sharing issues, welfare economics, and equity principles.
- Problems of pollution and resource scarcity elsewhere also affect Canada.
- The paradigm of fast economic growth has failed to alleviate poverty.
- Canada is a strong participant in the United Nations, generally supporting multilateral efforts to attain security and peace worldwide and at home.
- The first of the Millennium Development Goals aims to eradicate extreme poverty and hunger, with the initial target of halving, between 1990 and 2015, the proportion of people whose income is less than \$1 a day.
- The development agenda has largely evolved separately from the environmental agenda with research taking place in one sphere, and sometimes giving nominal reference to the other.

Research Needs

- Identify the links between poverty and the environment at the local level.
- Identify the sustainable development goals of developing countries and assess how Canada can contribute to an agenda for change that bridges the gap between northern and southern perspectives.
- Assess the effectiveness of programs designed to increase developing country capacity to participate effectively in the multilateral system.
- Examine how international trade and investment can contribute optimally to the achievement of sustainable development.
- Assess donor efforts at policy coherence and donor coordination.

Research Needs Clusters

In identifying the research needs outlined above, it became clear that the needs related to each issue could be clustered, thereby demonstrating the potential for synergies among them. This clustering could prove useful in considering the next steps in policy development and in achieving efficiencies. Six clusters have been selected.

Adaptation and Change

- Identify factors that have led to successful change for sustainable development in cities. (Urban Redesign)
- Carry out a comparative analysis of cases in which eco-region frameworks have been used as the basis for decision making. (Eco-region Sustainability)
- Analyze the prospect for regionalism to impact on sustainable development. (Impacts of Globalization on Canada)
- Carry out research on what motivates Canadians to change. (Unsustainable Lifestyles)
- Investigate communications and engagement approaches that stimulate collective responses. (Unsustainable Lifestyles)
- Identify the links between poverty and the environment at the local level. (International Engagement: Poverty and Sustainable Development)
- Examine how international trade and investment can contribute optimally to the achievement of sustainable development. (International Engagement: Poverty and Sustainable Development)

Ecosystems

- Advance our understanding of the key ecosystems and ecological structures required to sustain ecosystem services. (Eco-region Sustainability)
- Determine how to leave enough water in ecosystems to provide a full range of ecological services. (Freshwater Management)

Ecology/Economic Integration

- Develop full-cost pricing of water, including analysis of its distributional effects. (Freshwater Management)
- Develop proper valuation of ecosystem services and the institutions required for mediating conflicts when different social groups assign different values to these services. (Eco-region Sustainability)
- Develop a framework that combines monetary and non-monetary instruments. (Signals and Incentives)
- Evaluate economic instruments and their applicability in relation to biodiversity and habitat conservation. (Signals and Incentives)

Implementation Strategies

- Determine how to implement sustainable development goals of cities that address a broader range of quality-of-life goals. (Urban Redesign)
- Investigate how to implement integrated freshwater management effectively. (Freshwater Management)
- Identify new tools for managing at the eco-region level. (Eco-region Sustainability)
- Develop appropriate indicator frameworks for Canada at various spatial levels and set priorities for constructing the necessary data sets. (Signals and Incentives)
- Identify the sustainable development goals of developing countries and assess how Canada can contribute to an agenda for change that bridges the gap between northern and southern perspectives. (International Engagement: Poverty and Sustainable Development)
- Assess the effectiveness of programs to improve developing country capacity to participate effectively in the multilateral system. (International Engagement: Poverty and Sustainable Development)
- Examine the cumulative impacts of intensive livestock production. (Freshwater Management)
- Research examples of success in other countries to provide insight into solutions for Canada. (Urban Redesign)

Institutional Change

- Review ways to strengthen the federal influence and input to sustainable urban planning. (Urban Redesign)
- Develop common frameworks and understand how policy decisions taken at various levels of government are affecting individual watersheds. (Freshwater Management)
- Determine how various levels of government can link visions, goals, and policies at the scale of the eco-region. (Eco-region Sustainability)
- Define the legal, policy, and management arrangements for Aboriginal peoples. (Eco-region Sustainability)

Policy Instruments

- Investigate the mix of government and economic instruments that can advance urban sustainability. (Urban Redesign)
- Study the mix of rights, incentives, and administrative structures (e.g., conservation watershed management in Canada) to develop community capabilities for management of freshwater ecosystems. (Freshwater Management)
- Study the cross-linkages and synergies with other important policy drivers. (Freshwater Management)
- Study the possible regulatory impacts of liberalization of services trade and investment. (Impacts of Globalization on Canada)
- Determine how to better communicate concepts and frameworks to the public. (Signals and Incentives)
- Strengthen evidence-based research on the effectiveness of social instruments in the environment and sustainable development field. (Unsustainable Lifestyles)
- Investigate how sustainable development policy instruments can be combined more effectively. (Unsustainable Lifestyles)
- Assess donor efforts at policy coherence and donor coordination. (International Engagement: Poverty and Sustainable Development)

Introduction

What is Sustainable Development?

The United Nations Conference on the Human Environment (Stockholm Conference) in 1972 brought sustainable development – the notion that environmental protection and development, particularly poverty alleviation, were compatible and necessary for a better quality of life – into the lexicon of international politics. At that time, environmental issues were high on the public agenda in developed countries with the core debate focused on environmental quality versus economic growth. Concurrently, developing countries were mainly concerned with the urgent and compelling goal of development, which had been the focus of the international community for two decades and, more recently, endorsed by proposals set out by the United Nations for the Second Development Decade.

Since then, sustainable development has been debated and defined at numerous forums and by various researchers, policy-makers, activists, and others worldwide. A common starting point for most discussion and analysis is the Brundtland Commission definition of sustainable development from its seminal 1987 report *Our Common Future*. This definition of sustainable development – “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p.43) – broadly embodies two key concepts. First, is the concept of “needs,” particularly the overriding priority of the essential needs of the world’s poor. And second is the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs. While not without its critics, this definition has been widely accepted and has also allowed for diverse interpretations, enabling a rich debate.

The initial divide between those seeking environmental protection and those seeking development still reverberates in sustainable development discourse today. Even though considerable progress has been made on integrating environment and development in such fields as ecological economics, integrated assessment, and complex systems analysis, this integrative endeavour is still in its infancy, and influenced significantly by political upheaval, growing population pressures, environmental degradation, and human misery in many parts of the world.

Canada and Sustainable Development

Canada has been involved in the definition and evolution of sustainable development since the concept first came into active use in international policy-making. Canadians, including Maurice Strong, the Secretary-General for both the United Nations Conference on the Human Environment (Stockholm Conference) in 1972 and the United Nations Conference on Environment and Development (Earth Summit) in 1992; and Jim MacNeill, the Secretary-General for the World Commission on Environment and Development (Brundtland Commission), have been at the forefront.¹ Since the release of the Brundtland Commission report *Our Common Future* in 1987, there has been a surge of activity and policy-making at various levels of government and in civil society aimed at advancing sustainable development. This is particularly evident in the international policy arena where several global conferences on sustainable development have been held and regimes formed around the implementation of various multilateral environmental agreements, such as the United Nations Convention on Biological Diversity and the United Nations Framework Convention on Climate Change.

According to the most recent *Yearbook of International Cooperation on Environment and Development*, Canada has signed and/or ratified at least 45 multilateral environmental conventions and agreements (Schram and Thommessen, 2002: 224-225). In addition, Canada is signatory to numerous agendas for action such as Agenda 21, the Habitat Agenda, Beijing Declaration and Platform for Action, and the World Summit on Sustainable Development (WSSD) Plan of Implementation; various declarations such as the Millennium Declaration and Universal Declaration of Human Rights; and several international economic arrangements and trade treaties. The Canadian Department of Foreign Affairs and International Trade's Database of Canada's International Environmental Commitments, a more extensive inventory including only environmental agreements, lists 130 bilateral and multilateral binding and non-binding agreements (DFAIT, 2003).

Despite Canada's many international agreements and contributions, efforts to implement sustainable development in Canada have been limited. Early post-Brundtland enthusiasm saw the creation of national and provincial round tables on the environment and economy. Most folded, however, by 1995 leaving only the National Round Table on the Environment and Economy, and the Manitoba Round Table on Sustainable Development. Otherwise, the primary mechanism for implementing sustainable development in Canada was the creation of the Office of the Commissioner of the Environment and Sustainable Development within the Office of the Auditor General, and the requirement that all federal departments must file sustainable development strategies showing how they will implement sustainable development principles in their policies and programs, which the Commissioner then audits.²

Issue Selection

The seven issues chosen for advancing sustainable development in Canada are not necessarily new, but are important and not easily resolved. The selection of issues is substantiated by a review of several surveys published in 2002, 30 years after the Stockholm Conference. From among these surveys the following issues were noted most frequently: freshwater, poverty, globalization and trade, unsustainable consumption, climate change and energy, land degradation and deforestation, health and HIV/AIDS, and biodiversity loss (UNV, 2002; Environics, 2002; World Wide Fund, 2002). The United Nations WEHAB agenda (Water, Energy, Health, Agriculture and Biodiversity) for the WSSD focused on five key areas, namely, water, energy, health, agriculture, and biodiversity/ecosystem management, for priority action (UN, CSD, 2003). Regionally, the GEO 3 report listed several North American environmental issues (see Box 1) (UNEP, 2002). In Canada, a December 2000 pilot survey of 18 recognized international and Canadian Environmental Knowledge Centres done for Environment Canada named water, trade and environment, and climate change as the top emerging environmental issues; climate change, environmental governance, and resource management as the three issues most needing public policy research, and climate change, biotechnology, and water as the three issues most needing scientific research (EC, 2000).

Box 1

North American Environmental Issues Noted in the 2002 GEO-3

- Land degradation
- Pesticides
- Forest health
- Habitat destruction and degradation
- Bio-invasion
- Groundwater
- Great Lakes water quality
- Conversion of fragile ecosystems in coastal areas
- Overexploitation of marine resources
- Pollution
- Ozone depletion
- Climate change
- Urban sprawl
- Ecological footprint
- Floods and climate change
- Forest fires

In addition, the experience was applied from two previous issue scans done by the International Institute for Sustainable Development (IISD), one in 1999 identifying priority sustainable development issues at the new millennium,³ and another for the WSSD, noting sustainable development successes and failures since the Rio Conference of 1992 (IISD, 2002).

The issues and research needs defined in this paper were developed within several constraints, which, at times, limited the ability to describe the full scope of the issue and its importance. These are mentioned here so the reader understands why certain critical aspects of each issue were not discussed. First, climate change is causing a sea change in policy and management, as it is extensively increasing uncertainties. While climate change impacts are alluded to, for the most part, these were not discussed – at the request of the Policy Research Initiative (PRI) – because of efforts occurring elsewhere in the federal government. And last, in an endeavour to keep the paper as concise as possible, some issues could only be broadly discussed.

Issues Selected by the IISD

- Urban redesign;
- freshwater management;
- eco-region sustainability;
- impacts of globalization on Canada;
- signals and incentives;
- unsustainable lifestyles; and
- international engagement: poverty and sustainable development.

Organization of the Issues

Sustainable development is increasingly being analyzed by using evolving systems thinking, which is well suited to the study of complex, ill-defined real situations (Hodge, 1996). This approach helps address problems of inadequately integrating ecological, economic, and social problems inherent in the development of dynamic and adaptive policy and management. Social and environmental dimensions can be seen as complex adaptive systems that are interconnected with, and embedded in, other systems. For example, a city would be nested in a regional, provincial, federal, and international hierarchy of formal policy systems, or could be viewed as existing in a bioregional, hemispheric, and global hierarchy of nested ecosystems. The challenges of managing such complex, dynamic systems are described by Glouberman.

Complex adaptive systems are made up of many individual, self-organizing elements capable of responding to others and their environment. The entire system can be seen as a network of relationships and interactions, in which the whole is very much more than the sum of the parts. A change in any part of the system, even in a single element produces reactions and changes in associated elements and the environment. Therefore, the effects of any one intervention in the system cannot be predicted with complete accuracy, because the system is always responding and adapting to changes and to the actions of individuals. Nevertheless, by making many small-scale changes and selecting those that produce the desired effects, individuals and groups may succeed in bringing about improvements in the system as a whole. At the same time, the tendency of elements within the system to organize themselves offers opportunities to bring about changes that benefit the system (Glouberman et al., 2003: 1).

Thus, inter-linked socio-ecological systems are viewed as nested sets at different scales that continually move through cycles of growth, accumulation, restructuring, and renewal. Here, smaller, faster cycles invent, experiment, and test, and are found at lower levels of the hierarchy, while systems at larger scales and levels are slower, but invigorated from below by the faster moving cycles of innovation. These larger, slower levels of the hierarchy stabilize and conserve accumulated memory of past successful experiments.

The work done on complex adaptive systems⁴ was adopted in organizing the issues in this paper. The use of this theory and consequent organization of issues is predicated on two assumptions. First, the US National Research Council's position that "society and its decision-makers must recognize that agricultural, urban, industrial and ecosystem processes interact with each other and must be evaluated as an integrated system," and to achieve this integrated approach, "location-specific" knowledge and know-how is particularly useful (US, NRC, 1999: 222). And, second, small-scale change at faster moving lower levels of a system hierarchy can drive change upward, advancing or hindering sustainable development (Axelrod and Cohen, 2000: 29).

The first four issues each focus on socio-ecological systems found at various spatial scales that are, by definition, location specific. They are ordered from the smallest to largest with urban systems first (**Urban Redesign**), followed by watersheds (**Freshwater Management**), eco-regions (**Eco-region Sustainability**) and global systems (**Impacts of Globalization on Canada**). The remaining three issues then look at various policy tools and their application to problems of sustainable development. Once again, they proceed from smaller through to larger scales. **Signals and Incentives** on economic instruments and monitoring, assessment and reporting, relates to individual decision making, **Unsustainable Lifestyles** on information and education instruments, relates to individual and group behaviour, and **International Engagement on Poverty and Sustainable Development** considers foreign aid for poverty alleviation, a national and international issue.

Issues

A. Urban Redesign

Urban infrastructure is the physical manifestation of our cultural and social values and, as such, demonstrates the underlying problems of our current urban form (Smith et al., 1998: 1-2). Established when the primary goal of city planners was to increase efficiency (Graham et al., 1998: 255), the shape of our urban infrastructure is now ill suited to newer realities. In the past few decades, population growth and rural-urban migration have created more and ever-larger cities that have become vibrant centres of culture and commerce (UN, Habitat, 2001a: 3). There is another side to this trend, however. High levels of consumption have created mountains of waste; growing population and inequitable distribution of wealth have resulted in more slums and homelessness; and addiction to automobiles leads to urban sprawl and decaying core areas (UN, Habitat, 2001b). Consequently, urban sustainable development has become critical and multi-dimensional; it now “relates to energy consumption, transportation and land use planning, community building, and environmental and social justice issues, as well as good environmental management” (Portney, 2003: 240).

The challenge is to bring about change in the way cities are designed and planned and reorient current infrastructure (in which much has been invested already) so it supports the sustainability of the larger-scale systems to which cities are linked. This problem is exacerbated by the lack of necessary financial support to cities by the provinces under which they are governed, and their limited authority to raise revenues through local taxation (Diamant and Carter, 1997: 4).

Rationale for Inclusion

General level of impact on the quality of life of Canadians

Seventy-nine percent of Canadians live in urban areas with a population of more than 10,000 people;⁵ Canadian cities have become socially diverse and home to the majority of service industries, which now dominate the national economy (Bradford, 2002). The flow of people, ideas, and capital generated by globalization has converged in urban centres, bestowing local decision makers with a great deal of influence on Canada’s economic innovation and social cohesion.⁶ Concurrently, the impact of cities on the environment is increasing. According to calculations done using the ecological footprint,⁷ Canadian cities appropriate land areas many times their size. For example, Vancouver, British Columbia, “appropriates the productive output of a land area nearly 174 times larger than its political area to support its present consumer lifestyle” (Global Vision, Last updated July 2000). Two recent Canadian reports to the United Nations⁸ also note the following urban problems, among others:

- the lack of provision of affordable housing;
- the lack of sustainable transportation planning;
- the need to maintain and extend basic infrastructure;
- the need to protect and restore the environment in and around cities;
- the need for more sustainable use of resources through changes in consumption patterns;
- the loss of agricultural land; and
- the increasing income disparity.

Social problems, such as poverty and crime, are mainly located in urban areas, and air pollution is now an immense health problem in some of Canada’s larger cities – a problem that is expected to worsen.

Urgency with which the issue needs to be addressed

Urban sustainability is a matter of great urgency. Cities are where the majority of Canadians live and work, and by undertaking activities that advance sustainable development, a large number of people would be affected. In addition, improvements in the urban environment would spill over into rural areas improving wildlife habitat and the rural environment. Even if urban sustainability is tackled in the near future, problems will probably continue for some time, as it is difficult to change built infrastructure and institutions in the short term.

Probability that lack of resolution will lead to increased conflict and need conflict management

Conflict is already part of urban life fed by problems associated with poverty and urban crime. The large urban footprint also creates conflicts with rural residents, such as when cities look for places to dump hazardous waste or when polluted water travels downstream. At a larger scale, the consumptive lifestyle of urban Canadians contributes to environmental degradation and resource scarcity in other parts of the world.

Scope of social significance

In Canada, urban issues have been part of a public debate that has captured the attention of federal policy-makers. The recent Prime Minister's Caucus Task Force on Urban Issues defined an urban strategy for Canada and called for projects and programs to, among other things, enhance and improve the quality of life for all Canadians, meet social obligations, contribute to sustainable development in transportation, infrastructure, and housing, adhere to environmental and land use standards, and assist Canada to comply with international agreements (Canada, PM, 2002: 7). In addition, a 2003 survey of Canadians living in major cities found urban residents want the federal and provincial governments to be more involved in addressing city needs, specifically in upgrading infrastructure and sourcing alternative types of funding beyond user fee increases and property taxes.⁹

International commitments and obligations

Canada has signed several international agreements and treaties, which directly impact cities. Agenda 21: Programme of Action for Sustainable Development, agreed to in 1992 at the Earth Summit, lays out eight program areas for urban sustainable development in Chapter 7. These objectives are expanded upon in the Habitat II agenda and global plan of action, agreed to in 1996. Specifically, at Habitat II, Canada made a commitment to "improve living conditions in the world's cities, towns, and villages" (Canada, 2001a: ii). This global call to action offers "a positive vision of sustainable human settlements, where all have adequate shelter, a healthy and safe environment, basic services, and productive and freely chosen employment" (Canada, 2001a: ii). At the World Summit on Sustainable Development (WSSD), national governments once again pledged to address sustainable development at local levels and engage the major groups¹⁰ in the process (ICLEI, 2002b: 5). The WSSD Plan of Implementation contains several specific recommendations regarding local-level action including enhancing the role and capacity of local authorities in implementing Agenda 21.

Change potential

Taken together, these documented trends and international commitments indicate a clear priority and opportunity for urban sustainability, and represent the multiple components of many of the issues addressed later in this paper. In addition, Canadian cities constitute a dynamic nexus of people, cultures, and ideas where innovation to advance sustainable development can incubate and take root. It is at this level that smaller, faster cycles of change provide the environment for diverse pilot projects that can generate innovative solutions to the various challenges of urban redesign. From the perspective of complex adaptive systems, adaptive cycles occurring at this level provide information and innovation that will drive adaptive cycles of change at higher levels.

Moreover, urban centres nest in larger socio-political and eco-regional systems making it necessary to "simultaneously address the particular and the general, the individual and the systemic" (Woollard and Rees, 1999: 29-30), and consider how urban systems can adapt to changing circumstances while retaining their resiliency.¹¹ This goal can be accomplished, at least in part, by policies that anticipate change (i.e., are flexible), tap into latent opportunities embedded in the system, and are strongly connected to ecological systems (Gunderson and Holling, 2002: 411).

Research Review

A significant trend in the 1990s was the adoption of sustainable development principles into official plans of most major Canadian cities. These official plans usually interpret urban sustainability as:

- a more compact urban form;
- reduced reliance on cars;
- an adequate supply and mix of housing;
- a broad range of employment activities;
- greater opportunities for cultural expression and social and leisure activities;
- conservation and protection of natural systems; and
- communities where diversity is valued and there is equitable access to services and opportunities (Graham et al., 1998: 260, 261).

Even so, Canadian cities have not yet moved into implementation, but rather are “tinkering at the edges of real sustainable development.”¹² Furthermore, sustainable development now appears to be an even more elusive goal for Canadian cities. In the 1990s, provincial governments decreased financial transfers to their municipalities while shifting responsibility for the delivery of some services they formerly delivered including vital social welfare (Diamant and Carter, 1997: 3-4). At the same time, cities are still subject to provincial frameworks and growth management strategies that may support or work against urban sustainability. Even those cities with well-intended sustainability initiatives are constrained by several other factors (Graham et al., 1998: 262-263), such as:

- the costs of improved transit accompanied by declining ridership;
- the high costs of redeveloping “brownfields” especially related to cleaning contaminated soils;¹³
- the difficulty of changing consumer preferences for low-density detached single-family homes with private yards;
- the vested interests of developers who have amassed large tracts of land on the urban periphery; and
- growing conflicts between regional and metropolitan governments stemming from more intense interaction between the periphery and core.

Elsewhere, urban sustainability has been advanced largely through local Agenda 21 initiatives. An International Council for Local Environmental Initiatives (ICLEI) survey (2002a: 3), evaluating progress made in implementing Local Agenda 21, found an increase in the number of initiatives in all regions of the world during the past five years, but that the extent of real progress in implementing them has yet to be determined. One interesting finding was that national campaigns directed at Local Agenda 21 “correlate directly with both high numbers of Local Agenda 21 processes in a country and the degree of activity of such processes” (ICLEI, 2002a: 12). Obstacles faced by municipalities in implementing these local initiatives in developed countries were, in order of priority:

- insufficient financial support regardless of gross national product (GNP) or the presence of a national campaign;
- lack of community interest, interdepartmental coordination and national support; and
- inability to effect change in policy, especially economic policy (ICLEI, 2002a: 20).

One conclusion of the survey was that even though local governments ultimately lead most Local Agenda 21 processes, national governments also have a role to play (ICLEI, 2002a: 21).

Support for a strong role for national governments was also bolstered by an analysis of the annual Sustainable Community competition held in Canada in 2000 (Parkinson and Roseland, 2002). While stakeholder involvement was the most important factor, policy at senior levels of government including “technical support and enabling policies that set benchmarks and guidelines but give municipalities freedom to choose how these will be implemented, was also extremely important” (Parkinson and Roseland, 2002: 426).

For the most part, the reasons why some cities pursue sustainable development more seriously than others are not yet apparent. An investigation into 24 American cities with sustainability approaches did not find any conclusive reasons, even though several demographic and other variables were analyzed. The only finding was that cities that need sustainability the most – those reliant on polluting manufacturing industries, with younger populations and fewer college graduates – tended to take sustainability less seriously (Portney, 2003: 238). This research did, however, raise many questions about how urban sustainability initiatives start and what they achieve. That is, what does it take to achieve actual, tangible results (Portney, 2003: 240)?

Policy solutions to urban sustainability range from the very broad to the very specific. Under consideration are new ways for cities to deliver their services such as privatization, public-private partnerships, and increased contracting out and revamping intergovernmental transfers and revenue sharing (Diamant and Carter, 1997: 4; Slack, 2002). The issue of accounting for externalities is also raised, as cities confer benefits beyond their boundaries; they contribute to the nation's competitive advantage. In addition, federal policies have an impact on cities, especially through international commitments, which are met by cities spending their budget money for implementation (Slack, 2002). A recent report on ecological fiscal reform¹⁴ in Canada looks specifically at how taxation and expenditure programs can support cleaner transportation, an issue that is integral to meeting urban sustainability commitments (NRTEE, 2002). Moreover, work is now underway on fiscal measures specifically for urban sustainability. A January 2003 progress report from the National Round Table on the Environment and the Economy (NRTEE) ranked 12 high-priority measures, with the top three being stable funding for transit, sustainability criteria to govern federal infrastructure program spending, and elimination of the Goods and Services Tax (GST) on municipal green infrastructure spending.¹⁵

One way to determine infrastructure needs and design parameters is to determine energy intensity, which is high in the built environment: people work and play indoors and vast amounts of energy are used to heat and cool buildings, construct infrastructure, and to travel to and from these indoor environments. In addition, many buildings are frequently designed without harnessing local climatic and environmental conditions that could reduce negative environmental impacts. Not only is much of this energy derived from fossil fuels contributing to global warming, but it is also undervalued (Smith et al., 1998: 35). The concept of “embodied energy”¹⁶ is often used in green building and design to determine the level of environmental impact and make design choices. Embodied energy analysis shows that “materials of lower embodied energy not only consume less energy in their production, but also that this lower figure is a good indicator that less steps were needed in manufacture” (Smith et al., 1998: 71). This type of analysis is not applied to any extent in Canada where much effort has gone into designing energy-efficient¹⁷ homes and buildings requiring less energy for heating and cooling. Currently, green design and redesign, such as that based on embodied energy, is mostly limited to demonstration projects.¹⁸

- **Determine how to implement sustainable development goals of cities that address a broader range of quality-of-life goals.**¹⁹ Agenda 21 has placed a large responsibility on cities to achieve sustainable development, as it is the awareness and actions of consumers and voters that will propel change. The question is how to go about doing this when current urban policy is largely driven by efficiency goals and the desire for economic growth despite commitments made by municipal governments to a broader range of quality-of-life goals.
- **Identify factors that have led to successful change for sustainable development in cities.** Generally, cities seem ready to pursue sustainable development objectives, but are constrained in their capacity to change. Research is needed on the readiness of individual cities to take sustainability seriously, as both social capital and built capacity will vary among them, and government policy will have to be tailored to some extent to their place-specific requirements. The research would focus on the incentives and disincentives for such action, as well as the socially and economically viable policy mix to implement them. This potential stream of research can also be applied internationally (NRTEE, 1999).
- **Investigate the mix of government and economic instruments that can advance urban sustainability.** The appropriate use of economic instruments along with standards, guidelines, and regulation is relatively unexplored. For example, there seems to be little information on how government budgets affect urban sustainable development specifically, and little research has been done on how taxation measures can stop urban sprawl. In addition, while the ecological footprint is a useful tool for estimating environmental externalities, the role of cities as implementers of international sustainable development commitments is not yet calculated. Other potential areas of research on the mix of government and economic instruments are on the specifics of how to use zoning and bylaws effectively, especially in conjunction with pricing that considers externalities and how local efforts can work within regional and provincial frameworks and strategies, and their connection to federal government commitments to sustainable development.
- **Research examples of success in other countries to provide insight into solutions for Canada.**
- **Review ways to strengthen the federal influence and input to sustainable urban planning.** Even though cities fall within provincial mandates, the federal government has several ways of influencing urban sustainability directly by focusing efforts on infrastructure and green procurement. An example of this is work done by Canada Mortgage and Housing Corporation (CMHC) on more sustainable urban design and planning.²⁰ Other options that serve as examples are:
 - the certification of building materials and developing building codes based on sustainability criteria,²¹ and
 - ensuring that federal guidelines for waste management, water quality, and transportation infrastructure are based on appropriate sustainability criteria.

B. Freshwater Management

We may live on a blue planet, but if all the world's water could fit in a one-litre jug, only about one tablespoon would be freshwater suitable for our use and less than a drop actually accessible. According to UNESCO's recently released report *Water for People: Water for Life*, we are facing a serious water crisis worldwide, and indicators suggest a worsening situation unless corrective action is taken (UNESCO, 2002: 4). The report further elaborates on the need to share water worldwide in an equitable manner. In Canada, we are water wealthy with our vast network of lakes and rivers that sustains all life: it serves the health of ecosystems and provides ecological services on which Canadians depend. In addition, close to eight million Canadians rely on groundwater for domestic use (EC, 2003: 2). The conundrum in Canada is that the availability of these resources varies considerably across the country, between years and among the seasons (NRCan, 2002: 1). Water is a precious resource and aside from its life-giving characteristic, it contributes an estimated \$7.5 billion to \$23 billion annually to the Canadian economy (NRCan, 2002). Moreover, at regional, national, and global scales "the scope of water-related environmental issues (ecological impoverishment, water availability, and human health and quality of life) exceeds the capacity of individual disciplines, institutions, or nations to address them" (Naiman et al., 1995: 3).

Rationale for Inclusion

General level of impact on the quality of life of Canadians

Managing the quality of Canada's freshwater resources in a sustainable manner is a critical issue due to the mounting domestic and global pressures on this resource coupled with the effects of climate change. Domestically, our water quality issues are pressing, as evident from the tragic deaths from contaminated drinking water in Walkerton, Ontario, to the concerns of a dying Lake Winnipeg due to sewage and agricultural discharges. Canada's report to the World Water Forum III in 2003 noted that many basins are affected by pollution from industrial and municipal runoff, and airborne pollutants negatively impacting people and ecosystems. In addition, water supplies are threatened by inefficient use allowing for unnecessary over-consumption (EC, 2003: 2). Although more provinces are now moving toward compliance with Health Canada's 1996 *Guidelines for Canadian Drinking Water Quality*,²² by 2001 only Alberta, Nova Scotia, and Quebec had mostly or completely adopted the guidelines. Not one province or territory has appointed a single agency with the sole responsibility for all aspects of drinking water; most Canadian jurisdictions have failed to embrace comprehensive watershed management seriously and, consequently, there is much less emphasis on protecting drinking water *at source* than in other countries, including the United States (Sierra, 2001).

Urgency with which the issue needs to be addressed

Our relative complacency with regard to water management probably results from the huge natural endowment we enjoy. From a global perspective, Canada is a country with almost 10 percent of the world's freshwater, less than one percent of the world's population, and the second highest per capita consumption of freshwater (Canada, 1998: 2). Given our disproportionate share and consumption, there is certain to be increased global demand on our freshwater resources in many ways. Globalization has already increased the demand for our agriculture exports, with consequent increased pressure on our domestic freshwater resource. On the Canadian prairies, which comprise 80 percent of Canada's agricultural land base, the confluence of climate change and industrial agricultural intensification poses serious challenges (AAFC, 2000). Agriculture commands 50 percent of water withdrawals on the prairies, and will likely increase to meet growing export demands. The combined impact of increased point and non-point source pollution from intensive agricultural operations, with decreased natural flows due to climate change, irrigation withdrawals, and thermal power cooling demands is a serious threat to water quality (Conservation Manitoba, 2003). David Schindler, an internationally recognized scientist known for his work on water quality management, maintains that even though Canada rated second to Finland for the best quality water worldwide in the 2003 UNESCO report, we are destroying our freshwater with our current course of action.²³ He pinpoints urgent problems as being the ongoing drought in Western Canada, intensive livestock production, global warming melting glaciers, poor farm drainage practices, and overuse of chemical fertilizers.²⁴

Probability that lack of resolution will lead to increased conflict and need for conflict management

Water is essential for all life: droughts, floods, and sickness from poor water quality cause calamity and possible death, for all living species. This type of resource degradation and associated human imperilment causes general hardship and threatens existence. In addition, the growth of urban populations is creating conflicts between various types of users, as urban water supply is usually drawn from rural areas beyond city boundaries, and polluted waters from urban areas can cause problems downstream.

Conflicts over allocation are emerging in various parts of Canada. For example, in Ontario there are water shortages in some parts of the province each year, which are exacerbated during drought years. Deficiencies in the water permit program are thought to be one of the main causes of water-related problems. According to Leadlay and Kreutzwiler (1999), permits are issued free of charge with government paying for administration, investigation, and enforcement while budget cuts have dramatically reduced departmental ability to undertake these tasks. A drought in Alberta is also contributing to emerging water allocation conflicts in that province pitting ranchers against oil companies using freshwater injection processes. The Alberta government also uses a water permit system, but does not track how much water is used or for what Purpose (Leschart, 2003).

Scope of social significance

Access to clean freshwater has the attention of the international community, as well as Canadians. It is the first priority of the WEHAB agenda at the WSSD, and is listed as one of the world's priorities in various environmental and issue scans: all recognize that water is essential for human development and health of ecosystems upon which we depend. Furthermore, water issues in Canada have a higher public profile since the water quality problems at Walkerton, Ontario, and North Battleford, Saskatchewan; drought on the prairies; and recent epic floods in Manitoba and Quebec.

International commitments and obligations

The Canadian Water Resources Association (CWRA), through a two-year consultation process, developed a set of sustainability principles for water management in Canada that encompasses the goals of many international and national initiatives, particularly the Rio Declaration and chapter 18 of Agenda 21, both committed to by Canada at the 1992 Earth Summit (Leschart, 2003; Mitchell and Shrubsole, 1994: 5). Canada also agreed to commitments under the World Summit on Sustainable Development Plan of Implementation, in which freshwater issues are covered in Section IV, articles 24–28. Specifically, the Canadian commitment is to develop a national integrated water resources management strategy and efficiency plans by 2005, and to provide support to developing countries in meeting their water needs (WSSD, 2002). Such an integrated water resources management strategy would necessarily include wetland management, governed by the Ramsar Convention on Wetlands. This Convention, to which Canada is a signatory, obligates nations to designate and conserve wetlands; there are presently 35 Ramsar sites in Canada.

The Canadian Perspective prepared for the WSSD (Earth Summit, 2002) included water quality issues and made specific reference to an important approach called “regional ecosystem initiatives.” Regional ecosystem initiatives are similar to integrated water resources management (IWRM). These initiatives, such as the St. Lawrence Action Plan Vision 2000, have “helped Canadians achieve environmental results by generating a broad local basis of support for shared priorities for research and action, as well as through public-private partnerships and pooled resources and local capacity enhancement” (Earth Summit, 2002).

Change potential

Watershed approaches, such as IWRM, operate at larger spatial scales than cities and concretely link human settlements with rural areas, their larger biophysical environment, and other living species. Cities obtain their water supply from areas outside their borders, and urban runoff is a significant environmental detriment, discharging physical, chemical, and biological pollutants into waterways, which impair beneficial water uses downstream (EC, 2001: 47). Thus, urban areas, which operate at smaller and faster scales, communicate information and material to this next larger scale – often a watershed – that sets some of the conditions within which urban systems function. Similarly, accumulated ecological and social knowledge, and information of watershed systems are communicated to the next larger scale, that of the eco-region. This communication between system scales is critical to the sustainability of the system, which requires both change and persistence (Holling, 2001).

In this context, local knowledge about water and watersheds, if tapped and disseminated, can greatly influence management strategies at various system scales. In Sweden, for example, crayfish watershed management self-organized institutionally “from a few individuals to a nested set of organizations, facilitated by rules and incentives at the national level,” resulting in reshaped institutions that are more responsive to environmental signals and a better transfer of knowledge between local resource managers and scientists (Berkes et al., 2003: 379). Such local participation in water management makes sense in Canada given our poorer record of protection of source water, in particular. By building on Canadian experience with watershed projects such as the Fraser Basin Initiative and the St. Lawrence Action Plan, there appears to be a higher probability of improving freshwater resources generally.

Research Review

The central challenge for freshwater quality is to manage it in a more integrated way, both domestically and internationally. More specifically, it is about how Canada can advance the implementation of integrated water resource management across the country, defined by the Global Water Partnership²⁵ as a process “which promotes the coordinated development of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”. This process is viewed as the cornerstone for maintaining ecosystem health and sustainable land and water management, and ultimately, for global water security – many want it, but few have a good idea how to make it happen (Hanson, 2001: 13). One main obstacle is the multidisciplinary nature of IWRM. For example, the physical, biological, and chemical sciences comprising aquatic research still tend to work separately (Parks, 2003: 218).

The institutional arrangements for freshwater management in Canada have evolved from a period of water development in the 1970s, to water management through the 1980s, to a current focus on sustainable water management (Mitchell and Shrubsole, 1994: 61). The CWRA 1994 *Vision for Sustainability* adopted principles, which embody 10 prevailing concepts identified during a two-year consultation (Mitchell and Shrubsole, 1994: 5). These are:

- sustainable development;
- stewardship;
- ecosystem approach;
- effectiveness and efficiency;
- information, understanding and education;

- partnerships and stakeholders;
- impact assessment;
- adaptive management;
- anticipation and prevention; and
- alternative dispute resolutions.

The resulting water management principles that were adopted are organized into three clusters: integrated resource management, water conservation and protection of water quality, and techniques for resolving water management issues (see Box 2). In 1997, the CWRA published a review of sustainable water management practices in Canada to assess what the federal, provincial, territorial, First Nations, and municipal water managers had accomplished in terms of sustainable water management (CWRA, 1997). The report concluded that some progress was indeed being made toward sustainable water management in Canada – primarily through an emerging ecosystem approach to watershed governance at various scales. Initiatives that serve as examples include:

- the rise of conservation authorities in Ontario and other provinces, and their watershed planning approaches to integrated land use, water management, and environmental conservation (CWRA, 1997); and
- the regional ecosystem initiatives such as the Atlantic Coastal Action Program, the St. Lawrence Action Plan Vision 2000, Great Lakes 2000, the Northern River Basins Study/Northern Rivers Ecosystem Initiative, and the Fraser River Action Plan/Georgia Basin Ecosystem Initiative (CWRA, 1997).

Box 2

CWRA Sustainability Principles for Water Management in Canada

1. Practise integrated resource management by:

- linking water quality, quantity, and the management of other resources;
- recognizing hydrological, ecological, social, and institutional systems; and
- recognizing the importance of watershed and aquifer boundaries.

2. Encourage water conservation and the protection of water quality by:

- recognizing the value and limits of water resources, and the cost of providing it in adequate quantity and quality;
- acknowledging its consumptive and non-consumptive values to both humans and other species; and
- balancing education, market forces, and regulatory systems to promote choice and recognition of responsibility of beneficiaries to pay for the use of the resource.

3. Resolve water management issues by:

- employing planning, monitoring, and research;
- providing multidisciplinary information for decision making;
- encouraging active consultation and participation among all members of the public;
- using negotiation and mediation to seek consensus; and
- ensuring accountability through open communication, education, and public access to information.

Source: After Mitchell and Shrubsole (1994: 5).

The CWRA report concluded that although some progress was indeed being made, implementation of the concept was uneven across the country, and “has become a challenge in the face of significant reductions in government spending in many jurisdictions, federal and provincial” (CWRA, 1997: 21). The Commissioner of the Environment and Sustainable Development reviewed the Great Lakes 2000 program and concluded that even though there has been some improvement in the Great Lakes and the St. Lawrence River basin, there is still concern based on recent indicators. Specifically, budget cuts have reduced the ability of various departments to attend meetings and their capacity to achieve goals. There is a lack of basic information to establish priorities, develop action plans, and perform assessments (Canada, 2001b: 1-5). Another assessment of the state of integrated water resources management in the Slave and Athabasca River basins concluded that despite many government statements over the past three decades supporting integrated watershed planning, this strategy had not yet been implemented there (Kennett, 2001).

Currently, there is a vigorous public debate on whether water supply and treatment should be managed by private or public operators with strong advocates on both sides. While the discipline of the market is not a panacea for improved water resources management, clearly Canada, with the lowest average water prices in the OECD (UNESCO, 2002: 27), could improve the efficiency of its water resource allocation if prices reflected real costs – particularly the value of ecosystem services based on the hydrologic cycle.

The economic literature on allocation usually advocates correct pricing of water and internalization of externalities; this has not, however, solved problems of misallocation. The argument is that the market should be used for water allocation by transferring responsibility for the provision of water services to the private sector, with regulation substituting for the market where competition is not feasible (UNESCO, 2002: 185, 187). The trend toward decentralization and privatization of water management, however, pays little attention to the environmental impacts of water use and misuse, and the conundrum is how to ensure that such environmental and social considerations are factored into this new reality. An economic analysis of how to allocate and use water efficiently, concluded that the “failure to understand what the objective of water management should be [has] led to an over commitment to attempts to use water control works as a foundation for economic and social development” (Lee, 1999: 184). In addition, there has been more concern with the efficiency of management activities (a micro issue) rather than allocation among users (a macro issue) (Lee, 1999: 185). To offset this problem, public participation and new institutional decision-making and management systems are advocated (Lee, 1999: 197). Similar research on financing water management by the World Water Council and Global Water Partnership concluded that private operators can increase efficiency, but public sector oversight is required. Private operators need to be governed by appropriate regulation and contractual obligations so both environmental and social needs are met (Winpenny, 2003: 7).

In its recent report, *Water for People, Water for Life*, the UN makes some general observations that are salient in Canada as well; control of water resource assets – a fundamental public good – “should remain in the hands of governments and users” (UNESCO, 2002: 28). Private sector involvement should be regarded as a potential catalyst for water resource project development – not a precondition.

In Canada, government permitting or licensing has been the primary means of managing freshwater. Research on industrial water use shows that mining, manufacturing, and power generation facilities withdraw, on a yearly basis, over 70 percent of freshwater in Canada (Dupont and Renzetti, 2001: 413) and that it is mainly self-supplied and often unmetered, resulting in the degradation of water quality. In addition, the non-tradable permits used by government are usually given with little analysis of relative costs and benefits, and permit holders face no external price, creating inefficiencies in water use. Economic or market-based instruments are relatively unexplored as a policy option to manage freshwater use (Dupont and Renzetti, 2001: 426).

Research Needs

- **Investigate how to implement integrated freshwater management effectively.** While the concept is now widely accepted and the principles are in place, the “know-how” still needs to be generated. Several related factors require further research: improved methods of measuring change in key areas, how to incorporate climate change uncertainties into IWRM initiatives, and how to integrate adaptive management approaches into current practices.
- **Develop common frameworks and understand how policy decisions taken at various levels of government are affecting individual watersheds.** Freshwater management is a cross-boundary issue and involves a range of government agencies and departments at various levels of government. As yet, no clear federal policy exists on how to promote the creation of IWRM initiatives across Canada.
- **Determine how to leave enough water in ecosystems to provide a full range of ecological services.** The *World Water Vision*, produced by the IUCN (2000) presented this key idea for future research; there is a need to determine how to leave enough water in ecosystems to provide a full range of ecological services.
- **Examine the cumulative impacts of intensive livestock production.** Farm consolidation and larger-scale agricultural operations are threatening water quality.
- **Other areas of potential research include:**
 - development of full-cost pricing of water, including analysis of its distributional effects;²⁶
 - the study of the mix of rights, incentives, and administrative structures (e.g., conservation watershed management in Canada) to develop community capabilities for management of freshwater ecosystems; and
 - the cross-linkages and synergies with other important policy drivers. For example, Canada’s Climate Change Action Plan for compliance with the Kyoto Protocol has many elements that could impact water quality management beneficially. Large increases in renewable energy will decrease thermal energy dependence and, with it, the consumptive use of water for power plant cooling – a very large water resource demand in provinces reliant on thermal power production. Furthermore, one of the largest threats to rural water quality is surface and groundwater contamination by the waste products from industrial livestock operations – a risk highlighted by the Walkerton case. Rather than apply these waste products (typically pathogen-laden liquid manure) directly back on farmland, the waste could be transformed into a renewable bio-fuel and used to generate clean electricity, while creating a biologically inert fertilizer by-product. The required technology is well established, and the multiple benefits of such an integrated approach are climate-friendly energy generation, rural farm income diversification, *and* safer rural water supplies. This needs a more favourable regulatory climate for grid-connected small independent power producers.

C. Eco-Region Sustainability

Canada has several large eco-regions²⁷ that are suffering from habitat²⁸ degradation and loss, and because of this degradation they exact a toll on ecosystem services and livelihoods (Wildlife Habitat Canada, 2001: 61-81). To make better decisions to advance sustainable development, we need to look at problems and solutions as they interact on the landscape and over time. This type of place-based decision making considers the eco-region and associated human activity in its entirety instead of taking a more traditional and narrower sectoral or jurisdictional approach. With this approach, the dependence of human well-being on diverse ecosystems capable of providing necessary life-support services is more explicit. It is based on the premise that failure to understand and conserve the biodiversity of ecosystems will eventually lead to human impoverishment (CEC, 1997: 1-2). Moreover, it focuses on “intermediate scales, where multiple stresses intersect, where complexity is comprehensible, where integration is possible, where innovation and management happen...” (Forum, 2002: 3).

Rationale for Inclusion

General level of impact on the quality of life of Canadians

The quality of life of Canadians depends on the health and wealth of ecosystems. Even though conservation programs have been in place in Canada for many years, institutional arrangements that have prevailed in the past have not been adequate. There is a need for change that is motivated by habitat loss data showing that some areas of the country are at high risk (urban, agricultural, and some forest landscapes) and that all habitats are at some risk due to such global issues as climate change, long-range transport of air pollutants, and the invasion of exotic species (Wildlife Habitat Canada, 2001: 2-3). First, we must gain a new understanding of global change processes and the way our decisions impact on them. “A transition to sustainability cannot be expected to succeed if [it is] pursued within narrow disciplinary or sectoral frameworks” (US, NRC, 1999: 4).

Using eco-regions as the spatial decision-making unit has some advantages, as sustained life is a property of ecosystems, not species: ecosystems are open systems that change over time where changes in one part of the system affect other aspects of the system (EC, 1996: 2). Such an approach “provides a biologically meaningful geographic framework for biodiversity conservation and management at a broad scale.”²⁹ Furthermore, distributions of biological communities and habitat types rarely follow political boundaries, and conservation is based on the need to conserve a diversity of habitats through protected area networks or other biodiversity management schemes. Using political boundaries for biodiversity conservation “runs the risk of not only overlooking important features and conservation needs specific to each eco-region but also investing in redundant or poorly coordinated efforts in eco-regions that span political borders” (Ricketts et al., 1999: 2-3). Furthermore, including socio-economic factors linking human activities to ecosystems would delineate how land use practices and other human influences are directly affecting habitats and biodiversity.

Urgency with which the issue needs to be addressed

Overall, Canadian habitat is at low to minimal risk. There are, however, hotspots and areas of concern, that correspond with productive areas for fisheries, agriculture, and forestry (Wildlife Habitat Canada, 2001: 3, 11). Not only are livelihoods threatened, as with the collapse of the cod fishery on the Atlantic Coast which resulted in 40,000 job losses (CBC, 2003), but flora and fauna face extinction. The number of endangered species in Canada has risen from 178 in 1988 to 415 in 2002 (COSEWIC, 2002). It should be noted, however, that this increase in species at risk is more representative of the capacity of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to assess species than of the rate at which species are becoming endangered; many hundreds of species have not yet been examined (COSEWIC, November 29, 2002). Not surprisingly, the more heavily

populated eco-regions are where both species and habitats are also threatened. These include the Mixedwood Plains (southern Ontario and Quebec), the Atlantic Maritime, Prairies, Boreal Shield, Pacific Maritime, Boreal Plains, and Montane Cordillera (Wildlife Habitat Canada, 2001: 17). The real threat from habitat loss is not a decline in species per se, but a long-term erosion of the variety of biological characteristics and functions. While human actions may alter habitat, and consequently, foster some speciation, the result is fewer high-level taxonomic groups and a shift in the earth's biota that will ultimately impoverish the planet (Slevin and Levin, 2002: 6).

Probability that lack of resolution will lead to increased conflict and need for conflict management

The loss of livelihoods associated with habitat degradation creates social upheaval, uncertainty and, if not dealt with, growing poverty. In some cases, migration occurs as people look for opportunities elsewhere. Conflict over dwindling environmental resources is played out time and again, as people struggle with perceived and real threats. Recent examples in Canada include rural-urban migration with loss of rural population and increasing rural fragmentation leading to urban dominated decision making (Mitchell, 1995: 158), the decline of the Pacific and Atlantic fisheries, and conflicts between Aboriginal communities and other loggers in forested areas (Craik and Quaile, 1999: 8).

Scope of social significance

The issue of endangered species appears to be more visible on the public's radar screen than the associated issues of habitat and biodiversity loss (Wildlife Habitat Canada, 2001: 18-19). For example, several provinces have endangered species legislation, and the Canadian government has recently passed the *Species at Risk Act*.³⁰ In addition, environmental NGOs have distributed information and run campaigns on endangered species. There have been some initiatives supporting habitat conservation, but they are fragmented. They include some programs aimed at developing new protected areas (e.g., WWF Endangered Spaces campaign), and the shift of some logging companies from clear-cutting to more ecosystem-friendly forms of logging. The 2000 report of the Panel on the Ecological Integrity of Canada's National Parks sought to make the importance and urgency of the need to stop the decline of ecological integrity of Canada's parks more of a public and government priority (Parks Canada, 2000). As yet, however, sustainable development at the scale of the eco-region is only being considered by a few government agencies such as the Commission for Environmental Cooperation and Agriculture and Agri-Food Canada, both of which are using the eco-region as an assessment and reporting unit. A small number of other efforts are coming from NGOs and include the development of the Habitat Information System, by Wildlife Habitat Canada, the Boreal Forest Research Network, and a recent and ongoing nature audit by the World Wildlife Fund Canada (2003: 6).

International commitments and obligations

Canada has taken some early steps in using a place-based approach for policy development, planning, and management. For example, as a signatory to the United Nations Convention on Biological Diversity, Canada has made a commitment to, "improve our understanding of ecosystems and increase resource management capability" (EC, 1995: 3). The first goal of the Canadian biodiversity strategy is employment of an ecological management approach to achieve Canadian commitments (EC, 1995: 19). This earlier interpretation of an ecosystem or "place-based" approach is now maturing into a more multidimensional and integrative approach, which is laid out in Canada's first national report to the Conference of the Parties to the Convention on Biological Diversity in 1998 (EC, 1998) that "set out goals, objectives, and activities necessary to address threats to Canada's biodiversity..." (WWF, 2003: 6). Progress in using the ecosystem approach in Canada has been limited, however (Canada, 2000).

The place-based or ecosystem approach is being used to frame some intermediate and large-scale assessments including the state of the environment report of the Commission for Economic Cooperation (CEC), of which Canada is a member (CEC, 1997: 1-2), the Millennium Ecosystem Assessment (nd) and the State of the Environment Report for Manitoba: 1997, which contains a pioneering assessment on the Prairie Ecozone (Manitoba, 1997: 16-79).

Change potential

Communities and watersheds are nested within eco-regions, which exist at a larger spatial scale. At the eco-region scale and from the complex adaptive systems perspective, institutions must be able to work across various scales of ecological and social organization to build system resilience so ecosystems can support social development. Institutional capacity is needed that responds to environmental feedback, learns and stores understanding, and is prepared for, and adaptive to, required change. A diversity of local and other levels of governance allows decisions to be made at different levels in society and creates feedback loops at various scales. Local-level resource management is enhanced by overlapping units of government that “can resolve conflicts, aggregate knowledge across scales and insure that when problems occur in smaller units, a larger unit can temporarily step in” (Berkes et al., 2003: 379). This ability to coordinate and develop policy at eco-region scales connects human knowledge from across local environments that could then be aggregated to provide a better basis for decision making on ways to conserve vital ecosystem services, a powerful tool for advancing sustainable development.

Research Review

The eco-region approach is about planning and managing human interactions with ecosystems, not managing ecosystems themselves (EC, 1996: 3). It incorporates a myriad of policies and laws already in place concerning aspects of regional development and environmental management, with many of these coming from different jurisdictions and sectors, and drives the development of integrative frameworks and cross-jurisdictional decision making.³¹ This type of analysis is effective for setting local and regional resource management goals, determining cross-sectoral impacts and carrying capacity, charting development possibilities and constraints, state of the environment reporting and environmental assessments, as well as developing biological criteria and water quality standards (EC, 1995: 2).

Using an ecosystem approach does, however, present a series of new, ongoing and familiar challenges, some of which were identified by the Environment Canada (1996: 19) Task Group on Ecosystem Approach and Ecosystem Science as being:

- people resistant to seeing beyond their jurisdiction;
- planning cycles and budget priorities that are difficult to coordinate among agencies;
- respect for the cultural and spiritual needs of the people of the ecosystem;

- the lack of scientific knowledge of the processes and factors influencing specific ecosystems;
- the lack of long-term funding so protocols to assess cumulative effects and predictive models can be developed; and
- the lack of a common language and tested information management systems among scientists and resource managers.

In addition, people are often disconnected from the ecosystem in which they live, a situation exacerbated by the growth in urban populations which experience nature in hinterlands differently, if at all (Thompson and Steiner, 1997: 189). This makes it difficult to develop public debate about the trade-offs of growth and quality of life in an eco-regional context.

These are not the only challenges. There has long been a “dichotomy of views held by ecologists and economists, making it difficult to reconcile the aims of economic development and growth with the need for environmental conservation.”³² One valuation framework that looks promising in bridging this divide is ecosystem services. According to Gretchen Daily (2000: 333), a primary researcher in this area, previously established policies, which “largely address local, reversible, and direct threats to human health” are no longer adequate, as they cannot manage today’s impacts that are largely irreversible and transforming the environment at unprecedented pace and geographic scale. The question is how to address the stark trade-offs with which we are confronted. Ecosystem services are a conceptual framework that “focuses on the wide array of important services that ecosystems and their biodiversity confer on society...[that] are essential to human experience and...could not be replaced by technology” (Daily, 2000: 334). According to Daily, the ecological attributes of ecosystems are characterized in economic terms, thus providing decision makers with valuable information. While this valuation tool has much potential to guide decisions, as yet we do not understand the nature of the value of the services provided by ecosystems, nor can we assess the full extent of our ecological debt (Daily, 2000: 337).

Determining the value of biodiversity and ecosystems is fraught with problems. There are no obvious ways of determining the value of biodiversity, because of the complexity of biological systems and a diversity of values found in social systems. Biodiversity is managed locally, but is also a public good, and differences between the values of local communities and what is valued for the public good are common (Vermeulen and Koziell, 2002: 1). In addition, most economic valuation techniques are not adequate, as they assign value to individual taxa, not biological variety and variability (Vermeulen and Koziell, 2002: 37). A Centre for International Forestry Research initiative to develop multidisciplinary landscape assessments based on particular value systems that could be communicated to policy-makers identified several unsolved methodological challenges in valuing biodiversity: ways to measure accessibility and scarcity of products (from forests), the frequency of use of the products, and the quantity of a product, and how to weight species, products and landscapes according to their importance (Vermeulen and Koziell, 2002: 38).

Case Example The Prairie Eco-Region (Southern Alberta, Saskatchewan, and Manitoba)

The Prairie eco-region provides an interesting example of the importance of tackling sustainable development at the eco-region scale. Here, agriculture dominates the landscape sharing soils, water resources, natural nutrient supplies, solar radiation, and other aspects of climate with the ecosystem, while manipulating and changing it (McRae et al., 2000: 8). Ninety percent of this eco-region is used for agriculture; the land has been modified into cropland, range, and pasture with which wildlife must coexist (Wildlife Habitat Canada, 2001: 55). This is in contrast to the Mixedwood Plains (Southern Ontario, St. Lawrence River Valley) where only 40 percent of the land is used for agriculture (other areas of Canada use even less land for agriculture) (Wildlife Habitat Canada, 2001).

Even though agriculture accounts for less than two percent of Canada's gross domestic product (GDP), Canada is the world's second largest exporter of wheat, most of which is grown in the prairie eco-region (CEC, 2001: 20). During the past two decades, however, farm-based rural economies have suffered from depressed commodity prices and unfavourable international market forces resulting in reduced incomes, high debt loads and depopulation of rural areas (Gertler, 1999: 122). At the same time farmers, have increased their use of industrial inputs such as irrigation, chemical fertilizers, and pesticides, moved toward agricultural specialization and intensification, and expanded farm size (CEC, 2001: 21). This has resulted in considerable water and soil pollution and a build up of toxins in ecosystems, which threaten both wildlife and humans, and less land being set aside for habitat conservation (CEC, 2001: 21). In addition, the prairies are subject to cyclical droughts now amplified by human activities, such as greenhouse gas emissions creating climate change, increased irrigation for agriculture, and water for increased numbers of livestock and people (Schindler, 2003).

The involvement of local and extra-local communities is necessary to build common visions, goals, and implementation strategies for sustainable development, and appropriate organizational and institutional arrangements. Today, farmers comprise less than four percent of the overall workforce in Canada, leaving decision making about vital habitats, such as those in the prairies, to fewer landowners with greater influence (Wildlife Habitat Canada, 2001: 54). In addition, prairie inhabitants have always depended on, and been involved in, long-distance trade and extra-local networks. They are mobile, moving to urban residences in winter or travelling to the United States (Gertler, 1999: 125-126). Hence, there is an ongoing challenge to changing farming practices, as local communities diminish in number and size.

Depopulation of the prairies has not resulted in less environmental stress, however. Habitat is still being lost through land conversion as farm sizes increase, and there has also been a decline in habitat quality and diversity (Wildlife Habitat Canada, 2001: 60). According to Wildlife Habitat Canada, landscape-level habitat data are patchy and "few programs are addressing the question of how much wildlife habitat we have on agricultural lands and where it is," making it difficult to design appropriate conservation measures (Wildlife Habitat Canada, 2001: 57).

Some early work on one aspect of ecosystem services of the prairie habitat was done in a study of prairie potholes. It found that there were economic gains from preserving wetlands instead of removing them and destroying nesting grounds for migratory waterfowl, as had traditionally been done through standard agricultural practices (Haab and McConnell, 2002: 2).

The few environmental and biodiversity specific programs in place mainly focus on incremental practices rather than an integrated system (WWF, 2003: 83). The lack of success in using this approach indicated by continuing habitat and livelihood loss suggests that looking at policies and strategies using the eco-region as a lens, a method that would connect both development and environmental management efforts more closely to ecosystem health, would be promising.

In addition to bridging the economy-ecology gap, eco-region sustainability invariably requires the cooperation of various agencies, levels of government and, in some cases, international cooperation (Thompson and Steiner, 1997: 190). A discussion of these institutional arrangements is beyond the scope of this paper, and the reader will find an interesting discussion of regional integration agreements, for example, in *Weaving the Rules of Our Common Future: Principles, Practices and Prospects for International Sustainable Development Law*, (Segger et al., 2002). There is also a chapter on federal-provincial relations and the environment in *Canadian Environmental Policy: Ecosystems, Politics and Process* (Boardman, 1992) which tracks efforts within Canada at inter-jurisdictional cooperation.

Research Needs

- **Carry out a comparative analysis of cases in which eco-region frameworks have been used as the basis for decision making.** Decision making, for the most part, is fractured along sectoral lines and jurisdictional boundaries. Moving toward an eco-region approach would require a fundamental change in how problems are framed and decisions made. There have been enough initiatives developed for smaller ecosystems, which would be able to provide some insight, such as integrated protected area management projects, UNESCO biosphere reserves, model forests, and sustainable watershed management.
- **Advance our understanding of the key ecosystems and ecological structures required to sustain ecosystem services.** The need for scientific knowledge of the processes and factors influencing specific ecosystems was also pointed out by the Environment Canada Task Group.
- **Develop proper valuation of ecosystem services** and the institutions required for mediating conflicts when different social groups assign different values to these services (Kinzig et al., 2000: 12).
- **Identify new tools for managing at the eco-region level.** Such an integrative, place-based approach would require a more sophisticated set of management tools to coordinate planning cycles and budget priorities between agencies and across various levels of government. This would include the development of a common language and tested information management systems between scientists and resource managers, and protocols to assess cumulative and cross-scale effects. More specifically, the cumulative effects of taxes and subsidies, market-based instruments, and regulatory regimes are not yet understood at the scale of the eco-region.
- **Determine how various levels of government can link visions, goals, and policies** at the scale of the eco-region. This will further reinforce the need for the emergence of new institutions for effective management.
- **Define the legal, policy, and management arrangements for Aboriginal peoples.** Another challenge noted by the Environment Canada Task Group is the need to improve co-management strategies respecting the cultural and spiritual needs of the people living and working in the eco-regions. In Canada, Aboriginal people have a unique history with the land and, over time, will be responsible for increasingly larger land areas as treaty rights are settled.

D. Impacts of Globalization on Canada

Before exploring how globalization impacts on sustainable development in Canada, we first need to define what is meant by globalization. To be clear, this paper deals with economic globalization, or the increasing interconnectedness of the world's states via *economic* linkages. National economies are increasingly integrated in a global economic structure, where all the elements needed to produce a final good or service – production of inputs, design, assembly, management, marketing, savings for investment – may be sourced from around the globe in a system held together by powerful communications, information, and transportation technologies. The trend toward globalization has been driven, in part, by these new technologies and, in part, by reduced barriers to international trade and investment flows.

The result has been a steady increase in the importance of international trade in the global economy. In the last 50 years, while the global economy quintupled, world trade grew by a factor of 14. Canada, as a small open economy, is as much a part of this phenomenon as any developed country, with exports as a share of GDP growing from 26.5 percent in 1988 to 43.1 percent in 2002 (DFAIT, 2002b).

The links between globalizing trends and sustainable development are numerous and complex, but the major elements can be grouped into three types:

- impacts on a state's ability to regulate in the interests of public policy objectives, such as a clean environment, human health and safety, health and education services, and others;
- impacts of increased flows of goods and services on the natural environment; and
- impacts of increased economic activity on income levels, income distribution, and employment, at the national and sub-national levels.

In an interactive hierarchy of systems, each at a different stage in its own adaptive cycle, the system of international trade would be considered a larger, slower system that directly influences social, environmental, and economic systems.

Rationale for Inclusion

General level of impact on the quality of life of Canadians

The focus here is on the first two previously stated types of impacts, which represent the less-explored avenues of research. There is substantial ongoing research on the economic impacts in Canada of globalization generally, and North American integration more specifically.

With respect to globalization and the ability to regulate for sustainable development, the ever-increasing international character of our economy, and that of our trading partners means that those policies that once were considered strictly domestic will increasingly have impacts on other countries. It is for this reason that since the Tokyo Round of multilateral trade negotiations in the 1960s, the WTO has sought to go beyond simply reducing tariffs, to have states commit to certain standards of behaviour in the course of domestic regulation. Thus, the Tokyo Round produced a code on non-tariff barriers to trade, such as labelling requirements and other such standards. The Uruguay Round (which concluded in 1994) went further, resulting in agreements on sanitary and phyto-sanitary standards in food, animal and plant trade, agreements on intellectual property rights, the treatment of foreign investors, government procurement, subsidies, and others. In effect, the rules of the WTO have been reaching behind national borders to regulate the myriad domestic processes that can impede trade flows. Similar agreements for most of these elements are found in NAFTA, some being considerably stronger than the WTO versions.

In several of these areas, we are beginning to see potential for consequences that are considerably more intrusive and restrictive than was arguably intended by the drafters. In the area of investment, the potential problems can be illustrated by reference to the case of *Methanex Corp. vs. the United State of America*, a case brought under NAFTA's investor protection provisions. In this case Methanex Corp., a Canadian firm, is suing the United States over a Californian law that bans the use of the gasoline additive methyl tertiary butyl ether (MTBE), a suspected carcinogen that had been found to be contaminating groundwater supplies. Methanex claims, in a suit that is still pending, that the ban expropriates its investments in the United States, since it manufactures the major component of MTBE. There is some reason in case law to worry about the outcome, in which Methanex is seeking almost a billion dollars in damages.

The links to sustainable development are strong. To the extent that international investment agreements impinge on the ability of the Canadian government to regulate in the public interest, they will work against sustainable development.

In the area of trade in services, negotiations have not yet advanced enough to render worrying results, but a number of analysts predict such results if Canada opens up its services to full competition by foreign providers. Ongoing negotiations in the WTO offer this possibility. The types of services most often identified as vulnerable are education and health care. In both cases, the prospect of foreign providers strikes a chord with Canadians, who define themselves, to some extent, by the nature of their health care system, and who fear a loss of quality and of cultural values in a school system run for profit by foreign providers.

The impacts of globalization on the environment and natural resources, and the regulatory impacts of liberalization discussed above, have more direct effects. Liberalized trade flows can, depending on the sector, affect the scale of productive activity, the mix of industry types, and the types of technology used. All of these economic changes filter down to environmental changes, some positive, some negative.

The range of policies leading to such changes is broad, including *inter alia* liberalization of agricultural trade (with attendant reductions in subsidies), liberalization of trade in environmental goods and services, tightened disciplines on intellectual property rights, removal of restrictions on textile imports, and free trade in energy.

Urgency with which the issue needs to be addressed

The globalization-sustainable development linkages span a vast array of policy challenges, each with differing degrees of urgency. The areas of investment and services are under negotiation in the WTO, the FTAA, and various bilateral agreements, and should ideally have been adequately addressed *before* the negotiations began. Finally, negotiated text on such rules is extremely difficult to change. These, then, are areas of urgency.

On the other hand, the direct impacts of globalization on the environment and natural resources, while important to sustainable development, command less urgency. None of the agreements being negotiated are likely to have significant environmental effects. Agriculture is an exception, but the prospects for a final WTO deal on agriculture look progressively less, rather than more, imminent as negotiations proceed. Odds are that some deal will eventually be penned, but it will likely be a number of years away, and it will likely have minimal impacts when considered in the light of the objectives that frame those negotiations.

The issue of the regionalization of trade policy is of some urgency as well, because of the dizzying pace with which the trend is progressing. We need to understand quickly what the implications will be for Canada of the decline of multilateralism, in terms of economic, social, environmental, and regulatory impacts.

Probability that lack of resolution will lead to increased conflict and need for conflict management

At its heart, the potential for conflict is driven by the power imbalances that exist between economic objectives and non-commercial policy objectives – an imbalance that begins at the domestic level and from there is enshrined in international agreements. A classic example is in the North American context, where NAFTA gives private investors extremely powerful rights of action, allowing them to sue governments directly for damages in the case of unfair treatment. Yet, the rights of action given citizens to contest non-enforcement of environmental measures in the NAFTA countries (articles 14 and 15 of the North American Agreement on Environmental Cooperation, the NAFTA environmental side agreement) are essentially toothless.

Given those imbalances, the effects of trade on environment – both positive and negative – are unintended, and typically unaccounted for in the trade policy-making process.

Canada's vulnerability and opportunities in relation to globalization are in large part determined by Canada's location, with only one real neighbor, albeit a significant one – the United States. To make a firm commitment to sustainable development creates both economic and political dilemmas for Canada for which there are no easy solutions. US inability or refusal to ratify the key multilateral environmental agreements to which Canada is a party, for example, is a problem. The most obvious cases are the Kyoto Protocol and the Basel Convention, which create border and competitiveness challenges for Canada (Zhang, 2003).

The United States is also an aggressive leader in liberalization initiatives that will certainly have impacts on Canada, such as the ongoing negotiation of the Free Trade Area of the Americas, and the rapid proliferation of bilateral US trade agreements. With regard to the latter, it is not clear how the accelerating web of bilaterals pursued by the United States will impact on the strength and evolution of the WTO, which many see to be increasingly marginalized by such deals. As a relatively small economy, and specifically one that exports over 80 percent of its goods and services to its neighbour to the south, Canada depends strongly on a rules-based multilateral system to protect its interests and to resolve trade-related conflicts.

A failure to deal with the issues of regulatory impacts, particularly in the areas of investment and services, is likely to have social impacts that are repugnant to a large number of Canadians, leading to increased frequency and intensity of social protests of the type that manifested in Quebec City at the 2001 Summit of the Americas. The spheres of public policy that are potentially affected are highly emotive: environment, education, health.

The need for conflict management with respect to a failure to deal with the other issues addressed in the paper – direct impacts of globalization on the environment and natural resources – is likely to be far lower. Although these impacts are real and important, the lines of causality are too long and complex for most Canadians to understand and care about. The same is true of the impacts of the regionalization of trade policy.

Scope of social significance

An issue can have great social significance without necessarily being widely appreciated. Conversely, the amount of attention an issue gets is not necessarily reflective of its social significance. This is an important distinction in the area of direct impacts of globalization on the environment and natural resources within Canada, and for regionalization of trade policy. In the end, the impacts are likely to be significant. But there is unlikely to be much social awareness of those impacts.

The area of regulatory impacts, on the other hand, is likely to be a more widely shared concern. It covers areas of significant concern to most Canadians, and the lines of impact from the negotiation of multilateral or regional rules governing those areas are not difficult to understand. (In fact, if anything, they are too easily expressed in populist terms.)

International commitments and obligations

The major institutional drivers for globalization have been trade agreements at the multilateral, regional, and bilateral levels. In Canada's case, the Canada-US Free Trade Agreement, NAFTA, (which superseded it), and the WTO are by far the most significant influences. The latter is in the process of a new round of negotiations on a wide variety of fronts, scheduled to be wrapped up as a single package of agreements by 2005, though few believe the deadline will be met. Also due in 2005, and equally likely to run on much longer, is final agreement on the Free Trade Area of the Americas – a free trade zone covering all the countries in the hemisphere except Cuba.

Change potential

The potential for change on the issue of regulatory impacts is high. In the area of investment, the existing agreement under NAFTA (Chapter 11) has been the subject of intensive negotiations within and among the NAFTA parties, all of which realize current provisions are problematic. They are now looking for ways in which they could be improved. At the same time, Canada is negotiating other agreements with investment provisions, where any such improvements will certainly be incorporated. For example, the Minister for Trade, Pierre Pettigrew, is on record as saying that there will be no Chapter 11 in the FTAA. The Department is also on record as saying that education and health services are not on the table in the GATS negotiations at the WTO, but such assertions made in the early stages of a negotiation must be proven when the final agreement is reached.

There is also some potential for change in light of research on the regionalization of trade policy. It is an issue that the WTO, for example, has been completely unable to come to grips with over the many years it has been on the agenda. But, depending on the results of the research, there may be a clear and pressing need for action by the Canadian government, and the potential is good that the message will be received with interest. Canada is particularly well placed to argue for specific directions in the current FTAA negotiations, as a respected middle power. It is similarly well placed to address the issues in the WTO, where its position as member of one of the world's largest regional trade agreements and its reputation for fair dealing give it some measure of force and credibility beyond its economic power.

Research Review

Only 10 years ago there was little research on either globalization and sustainable development, or the various elements of trade policy and sustainable development.³³ Research effort has exploded since the environment and sustainable development emerged as major change agents in the trade policy arena. Yet many issues remain with only modest research coverage and even more limited debate among researchers, which is essential to generate consensus results.

The initial focus of research in relation to trade – primarily the traditional agenda of trade in goods – was determined by the environmental implications of trade. The dynamics of this agenda were largely determined by the fact that economic outcomes of economic liberalization and environmental policy are similar without being congruent and by the international character of both issues. Trade policy and environmental policy promote structural economic change, to increase economic efficiency and decrease environmental consequences. Trade policy and environmental policy both have an inescapable international dimension rendering some form of policy coordination at the international level essential (Ward and Brack, 2000: 12). The resulting research agenda focused on issues, such as the ability to distinguish otherwise like products in trade by process and production methods, or the relationship between the trade regime and multilateral environmental agreements (Moltke, 2001). The expansion to embrace the full agenda of trade and sustainable development has not been followed in all countries, but both Canada and the European Union have shown an active interest.³⁴

More recently, there has been a surge in interest in assessing the environmental impacts of trade agreements.³⁵ Most of these studies are *ex post*, but some *ex ante* studies have been conducted. Such studies are in fact mandated for all trade agreements in Canada, the United States, the European Union and Norway.

Despite the intense interest, there are still areas where the research is thin. Most studies attempt to manage the enormity of the task by narrowing it down to a sectoral and regional scope, and certain types of impacts seem to have “fallen through the cracks.”

The research agenda on investment is one such, in part because it is inherently difficult, though it is in equal measure important (Moltke, 2000). While there has been much written about investment per se, there is a dearth of work that looks at the regulatory impacts of investment rules, particularly in light of the recent experience with NAFTA and the emerging experience of the bilateral investment treaties.

Neither has there been much work on the regulatory impacts of services liberalization, an area that is necessarily speculative for the most part, though we do have the experience of unilateral privatization and private-public partnerships to draw on in assessing the types of policy issues involved.

Research Needs

- **Study the possible regulatory impacts of liberalization of services trade and investment.** The ongoing negotiations in the FTAA will contain provisions on trade in services, and on investment. As well, the WTO may take up these negotiations. (It has a mandate to do so, but there is still some political opposition.) It is critical that we learn from the experience of the existing investment agreements, and from our limited experience of privatization of services provision, to guide future policy in this area. Sustainable development demands certain types of government action, and we should be careful not to subscribe to agreements that have the effect of unduly limiting the scope of that action.
- **Analyze the prospect for regionalism to impact on sustainable development.** There are prospects for increasing regionalization of international trade policy. This process is driven by the United States, whose pace in negotiating bilateral agreements shows no signs of abating, and through agreements being negotiated by the European Union (primarily with the African Caribbean and Pacific countries). Rudimentary structures have also been put in place in the Western Hemisphere, Africa and the Asia/Pacific region. In some cases, these agreements contain positive and innovative provisions related to sustainable development. (The recent US-Singapore bilateral investment treaty, for example, shows several significant improvements over the NAFTA investment provisions.) In others, such as the FTAA, the prospects for fostering sustainable development seem bleak, at least for now. There are two areas of necessary research here: a search for the best of the new institutional arrangements, with a view to their use in ongoing negotiations, and a search for the wider implications for multilateralism of the significant increase in bilateral and regional arrangements, and what it might mean for Canada’s economic, social, and environmental prosperity.

E. Signals and Incentives

Moving the economy on to a sustainable track requires that the things we produce and consume impose much less of a burden on the environment. The final buyers and consumers of goods and services are individuals. Individuals are also citizens and voters, in which role they affect the actions of governments; and they are employees or workers, in which role they may have an impact on production decisions at all stages in the economy. Fundamentally, individuals make the decisions that affect Canada's progress on the sustainable development path.

If we ask, then, how we might improve Canada's record in sustainable development, we must ask what motivates individual decisions in all of the contexts mentioned above. While government regulation is one tool that can be used to stimulate such change, economic theory has long argued that other approaches can prove more efficient in many cases. One such approach is to use the power of the market to induce consumers and producers to change. People, however, are motivated by more than just current market signals. They pay attention to short- and long-term goals that we, as a society, establish for ourselves; individuals often adjust their behaviour to be consistent with these goals, even though there may be no discernable economic payoff or cost.

Consumers and producers are guided by many sources of information in making their decisions. Some of these are direct – laws requiring certain behaviours, for example. Others are indirect, in that they do not require certain activities, but nevertheless provide incentives for actions. Two important categories of signals for making day-to-day decisions are monetary signals (incentives and disincentives expressed through markets), and non-monetary signals such as information. The problem is that economic signals are rarely linked to environmental signals in a direct way. Market-based signals can be improved by ensuring that they reflect environmental externalities,³⁶ which are now borne by society as a whole, to the extent possible. Here, the challenge is to find ways to calculate the cost of the externalities, and devise tools that increase prices to suitable levels in a socially and economically appropriate way. In addition to prices, information about goals and progress toward sustainable development can influence economic and environmental decisions. Such information is already extensively used for environmental management and environmental assessment and reporting. The challenge is to develop and refine both market and non-market based approaches so they reinforce each other, thus more readily enabling adaptation to changing circumstances. In addition, they need to connect with overall policy objectives.

Two examples can be given. Household recycling has been supported both economically through subsidies and through advertising and information campaigns, and has been quite successful. On the other hand, despite continuing information regarding energy efficiency progress, the passenger vehicle fleet in Canada is not getting more efficient, due to the increasing proportion of low-fuel-efficiency vehicles. In part this may be attributable to low-cost gasoline (Sternier, 2003: 241).

Rationale for Inclusion

General level of impact on the quality of life of Canadians

Signals and incentives are tools for advancing sustainable development. The exercise of building common goals for sustainable development and measuring progress in meeting them is important to moving forward and ensuring that we are making the right decisions. Moreover, the right signals and incentives provide important stimuli to technology development and implementation.³⁷ Both the monetary and the non-monetary components act as incentives to inventors and investors, applying a steady and ongoing pressure for improvement.

Urgency with which the issue needs to be addressed

Canada has started to fall behind in formulating and providing such signals and incentives. Many countries in Europe and some states in the United States are implementing policies that move toward internalizing externalities (market signals) and providing information on the state of sustainable development (non-monetary signals). The research outlined here should help Canada see ways to catch up with some of its trading partners. The most salient example is that of energy efficiency, where higher prices and other policies in Europe have contributed to a more efficient economy than is found in Canada.³⁸

Probability that lack of resolution will lead to increased conflict and need for conflict management

Monetary and non-monetary signals and incentives reflect the norms and values of the group developing and using them; it is through this exercise of valuation that conflicts emerge between groups and the space is created in which the intricate dance of “trade-offs” occurs. Miscommunication between signals from the environment and incentives from the market ignite dissention and prevent necessary adaptation from taking place in a timely way. One example of this is the demise of the east coast cod fishery (Harris, 1998).

Scope of social significance

Interest in this issue mainly resides with policy-makers and analysts (from all sectors) within the environment-economy and/or the science-policy debates and, to various extents, in academic research on ecological economics and the concept of *Homo sustinens*, conservation ecology and complex adaptive systems, and sustainability science (Ruitenbeek and Carter, 2001: 3).

International commitments and obligations

Information for decision making was addressed in sections 30.9 and 40.6 of Agenda 21, which called for the development of systems to help internalize externalities and measure sustainable development progress. This was reiterated in the WSSD Plan of Implementation in sections 18 b and 119. This recognition of the importance of monetary and non-monetary information reflects two widely shared assumptions:

- the market operating with good price information is a powerful force for rebalancing purchasing decisions to reduce environmental costs; and
- good measurement tools are required for good policy development.

“Physical [i.e., non-monetary, in this case] and monetary measures have rarely been linked or compared” (Bartelmus, 2001: 10). Thus, there has been only modest progress on developing accurate signals for decision making, and little progress on delinking economic growth from environmental damage. In addition, “decisions involving environment / development issues are...made under conditions of imperfect information and uncertainty” (Pintér, 2002: 6). This is a critical issue if Canada and other countries are to get on to a sustainable development track.

Change potential

Figure 1 shows how adaptive policy design can link signals and incentives. It notes how we can achieve long-term goals (in this case sustainable development) by developing policy that is highly flexible (i.e., allows adaptation to new ecosystem knowledge, and incorporates the precautionary principle) and is able to adapt quickly to new knowledge about ecosystem functioning and services. By explicitly building information feedback loops into new policy, risk to the environment and hence people will be reduced. Adaptive (flexible) policy design, which can be applied to policy design generally, moves beyond the use of “politically rational” instruments (Eliadis, 2002: 3) formerly in vogue for the design of policies with instruments designed to capture “risk” and “uncertainties” inherent in systems subject to surprise and new knowledge. Such adaptive policies aim to be robust across a range of plausible futures rather than optimize a best estimate future (Walker et al., 2001).

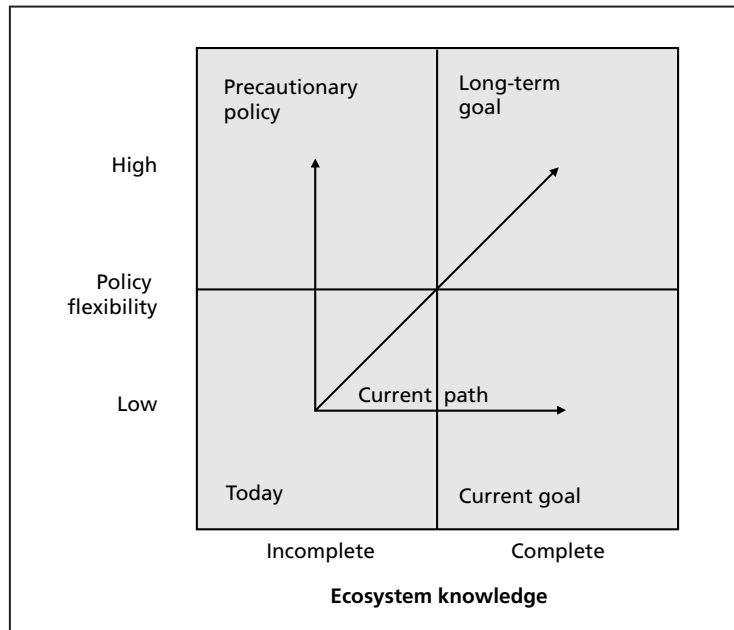
Research Review

The Brundtland Commission maintained that policy failures were caused by a lack of consideration for the interdependences among nature, the economy, and society (WCED, 1987: 9). This observation was followed by a plethora of information on sustainable development and how to account for socio-ecological interconnections. Even so, there is still an “information deficit,” which people attempt to fill by using non-scientific information sources and relying on their best judgment, resulting in “subjective, fragmented, imprecise and sub-optimal” decisions (Pintér, 2002: 6). This information deficit comes as no surprise, as the research on signals and incentives for sustainable development shows an existing fundamental lack of integration between the three dimensions of sustainable development: environment, the economy, and society. Specifically, environmentalists refute the commoditization of the environment meaning that they often dislike market-based instruments that internalize estimated environmental costs, and prefer government to protect the environment through regulation and standards, while economists support the ability of the market to account for environmental and social externalities.

Traditionally, information regarding the condition of the environment has been gathered in “state-of-the-environment” reports. This approach typically includes the use of “physical” indicators, which are now being integrated with the normative goals, principles, and aspirations of the sustainable development agenda.³⁹ Furthermore, this normative agenda is driving what information is gathered and what is communicated. “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” (Hardi and Zdan, 1997: 10). These information gathering and evaluation exercises record changes to environmental and ecological systems, which are then used to develop societal responses to improving environmental conditions (Moffatt et al., 2001: 37). Examples of such efforts include two recently developed state-of-sustainable-development reporting systems: the Dashboard of Sustainability⁴⁰ and the Environmental Sustainability Index.⁴¹

Societal responses to assessments depend on several factors, such as government priorities and policies, as well as other signals coming from the market, individual state of well-being and pressure groups. Hence, the development of a robust set of indicators and data sets is important if we are to reflect the state of sustainable development and communicate the results with as much accuracy as possible. Numerous models and indicators have been developed in answer to this need and are discussed in such publications as *Measuring Sustainable Development: Review of Current Practice* (Hardi and Barg, 1997) and *Unveiling Wealth: On Money, Quality of life and Sustainability* (Bartelmus, 2001).

Figure 1: Policy Development Pathways



Many economists and other policy-makers look to the markets to provide the right signals. The externalization of social and environmental costs by private business, however, is well known and well documented (Topfer, 2001: 4). Market prices do not systematically integrate these externalized costs, and economic instruments, which encompass a range of policy tools,⁴² are being used to “encourage behaviour through their impact on market signals rather than through explicit directives regarding pollution control levels or methods” (Stavins, 2000: 1). Economic instruments are usually combined with regulatory and voluntary instruments and, as such, become part of a complex system of existing and proposed government policies and need to operate effectively with other policies. The exercise of combining instruments, however, needs to be thoughtfully done, as choosing the right instrument or mix of instruments is a daunting exercise (UNEP, 2002b: 6, 8).

Recent work done on ecological fiscal reform by the National Round Table on The Environment and the Economy highlights the challenges involved in using fiscal measures and economic instruments. They found that Canada has made limited use of economic instruments and that there is room to increase their use, but note that the combination of instruments to use should be made only after the goals and objectives have been established and the role of the instrument defined (NRTEE, 2002: 11).

Case Example Adaptive Policies

The challenge is to design policies that recognize risk; it is always evolving and needs to be allocated appropriately. Currently, most risk falls on the environment and we need to design policies that adjust quickly and automatically to new information and realities. An example of a social policy that automatically adjusts is that of employment insurance, which responds to the rate of unemployment without interventions by government. Environmental policies, however, frequently require a review before they can be adjusted to reflect environmental realities and/or new information. Examples include the *Canadian Environmental Protection Act*, which provides for adjustment by having sunset clauses requiring that the policy/legislation be revisited at specified time intervals, or wildlife/fisheries management quotas whereby a new quota is set every year based on environmental information. Neither of these policies is directly tied to the marketplace.

The acid rain policy, which set the targets and timetables for SO₂ reductions in Eastern Canada, serves as an example of how environmental management could be improved by designing adaptive policies; it could be redesigned so the instrument adjusts to new environmental monitoring information. In this case, new scientific information emerged after the policy was established and agreements were in place; it showed that the progress on acidification mitigation had been insufficient even though previously set targets had been met. Government reports on acid rain point to the daunting task of revising current caps on emissions as well as the economic, social, and environmental costs of not doing so (Canada, Federal, 1998; EC, 1999). In response, the federal government has committed to seeking stricter bilateral agreements, and the provinces have agreed in principle to setting new targets and time lines, with Ontario stating its intention to meet its requirements through the use of a trading scheme. Meanwhile, the acidification is continuing and negatively affecting both ecosystems and the health of Canadians (Venema et al., 2002: 12-14).

Research Needs

- **Develop a framework that combines monetary and non-monetary instruments** to present a consistent set of indicators to producers and consumers and thereby affect individual and corporate decision making. The problem is that as monetary and non-monetary information gathering is driven by fundamentally different conceptions, the frameworks for organizing that information and the data differ. The first research need, then, is to develop a common framework and establish the consistency of the instruments currently in use.
- **Develop appropriate indicator frameworks for Canada at various spatial levels and set priorities for constructing the necessary data sets.** The data sets and information streams for signal and incentive tools are also weak. This partly stems from our fundamental lack of knowledge about the functioning of specific ecosystems and the impacts of biodiversity loss. While much data have accumulated on weather patterns or water quality, as well as economic indicators like GNP, gaps and inconsistencies in data sets are common (NRTEE, 2003b).
- **Evaluate economic instruments and their applicability in relation to biodiversity and habitat conservation.** While much work on economic instruments has been directed toward capturing pollution externalities, little work has been done on evaluating economic instruments in relation to biodiversity and habitat conservation: most of the instruments in use provide non-monetary signals. This issue is of great importance, given the escalating loss of biodiversity. Some work has been done on this in relation to implementation of multilateral environmental agreements, but there is still much to be done within the Canadian context (Borregaard et al., 2003). Developing an integrative set of measurement tools consisting of economic instruments and non-monetary signals could provide consistent financial and psychological signals and thus greatly improve Canada's biodiversity.
- **Determine how to better communicate concepts and frameworks to the public.** Another research need is on how to communicate these complicated concepts and frameworks so they are understandable to the public. The linkages between social, economic, and environmental systems are not easily displayed and communicated. A focus, however, on this issue in the context of the identified research needs would produce helpful results.

F. Unsustainable Lifestyles

Humanity uses over a third more resources than what nature can regenerate; the ecological deficit is widening (IISD, 2002: 10). In Canada, levels of per capita consumption are considered unsustainable and inequitable by many (Project, 1995). And pressures on global resources are increasing from the emerging middle classes in developing countries, who aspire to the consumer lifestyles of the west (Myers, 2000: 5). But shifting behaviours in Canada to more sustainable lifestyles is proving difficult. Many sociologists working on this issue have pointed out “that a consumer’s choices are not isolated actions of rational decision-making” (Princen et al., 2002: 6). Rather, they are embedded in individual ideas about status and identity, influenced by contextual social forces, such as the media and advertising, and subject to larger structural features of the economy, environment, and policy. Policies, whether economic, environmental, or social, affect consumer choices and from among the many policy instruments available, moral suasion is one that is frequently used to motivate social change.

Moral suasion or social policy instruments currently used to support a shift in attitudes and behaviours fall into three groups: information, social marketing/mass communications, and education.

- Information instruments are designed to fill a perceived public information deficit (Hobson, 2002: 102) on causes and consequences of environmental change and actions that individuals can take. More specific information instruments provide an “information wrap”⁴³ around products (e.g., labels, environmental product profiles, standards) to influence consumer choice.
- Social marketing instruments encourage positive behaviour change by applying marketing principles to target audience interventions, usually involving mass media (e.g., energy conservation programs, recycling programs, and so forth).
- Education instruments support the inclusion of relevant content in teaching curricula at all levels of the formal education system. They also support non-formal processes to increase knowledge and understanding.

Previous assumptions underlying these so-called “soft” or “social” instruments have been that information, education, and increasing public awareness would induce positive voluntary actions supportive of sustainability (Hobson, 2002: 103). Given the continuing rise in consumption, these social instruments do not appear to be persuading people to change. The OECD notes in its 2002 report on trends in household consumption across OECD countries that “environmental impacts from household activities have worsened over the last three decades and are expected to intensify even more over the next twenty years, particularly in the areas of energy, transport and waste” (OECD, 2002: 15). The report also notes that addressing consumption remains at the periphery of policy development. Consequently, we have to question how social instruments, such as moral suasion and education, can be used more effectively to change individual consumer choices so they integrate stronger environmental values.

Rationale for Inclusion

General level of impact on the quality of life of Canadians

There is no doubt that the majority of Canadians enjoy a good quality of life. Canada has repeatedly been either the first or among the first three countries named in the UN Human Development Index (HDI). At the same time, Canadians have one of the largest ecological footprints, estimated to be 7.7 ha/cap (Wackernagel, 1997) with only the United States and Australia being higher.⁴⁴ Economic signals usually equate a better quality of life with economic growth. Many would argue, however, that Canadians will garner a better quality of life only when ecosystems are protected. It is the way in which this debate for the hearts and minds of Canadians unfolds that will ultimately determine our quality of life.

Urgency with which the issue needs to be addressed

High levels of consumption can be linked directly or indirectly to a number of significant danger signs in our ecosystems, such as high levels of emissions and waste that exceed the ability of the earth's sink capacities, and growing degradation of renewable resources such as water, soil, forests, fish, and biodiversity that undermines ecosystem integrity and livelihoods (UNDP, 1998: 2, 4). This issue is at the centre of sustainable development and the pace of change necessary to achieve it.

Probability that lack of resolution will lead to increased conflict and need for conflict management

Sustainable consumption is consistently on the agenda of most international sustainable development negotiations and agreements, where there is much conflict around this issue grounded in perceptions of an inequitable draw on resources to sustain lifestyles in Europe and North America, combined with the aspirations of many in developing and transitional countries to similar levels of consumption.

Scope of social significance

This issue has some currency, particularly among a North American demographic group called the "cultural creatives." Estimated to number approximately 50 million by demographic researchers, one of the identifiers of this group is their concern for the environment and core "green" values (Ray and Anderson, 2000: 14). Their choices are based on their concern for the environment: "what products they buy, the movements they support, and the life choices they make" (Ray and Anderson, 2000b: 63). According to social value research done by Environics, about five percent of Canadians are part of this demographic; they are interested in reducing their individual ecological footprint and purchasing from companies that have strong environmental and social ethics (Adams, 2000b: 200).

International commitments and obligations

Education, training, and public awareness gained some prominence in the Rio agreement process in 1992, as necessary supporting measures for the implementation of international agreements. Agenda 21, Chapter 36 links education, public awareness, and training to "achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development." There are parallels to the drafting language used in Chapter 36 in articles 12 and 13 of the Biodiversity Convention (Research and Training; Public Education and Awareness), to article 19 of the Desertification Convention (Capacity Building, Education and Public Awareness), and in article 6 on education, training, and public awareness in the Framework Convention on Climate Change. Implementation of these measures has been limited and uneven, however, with virtually no analysis of their effectiveness. Nevertheless, in reviewing the international legal context for "social" instruments, the multilateral environmental agreements provide a better framework than the WSSD Plan of Implementation. Only a few sub-clauses in Section III of the Plan (Changing unsustainable patterns of consumption and production) directly suggest policy instruments to influence individual choice: "develop awareness-raising programs (15 (d)), develop "consumer information tools" (15 (e)), "promote education to provide information... about available energy sources" (20(m)).

Change potential

Social system change is essential to building or maintaining the resilience of complex adaptive systems. Considering that much environmental change is now human-induced, cultivating the adaptive capabilities of humans becomes even more important. By setting people on the course of making decisions that are right for sustainable development, many problems can be solved or avoided.

Research Review

Canadians traditionally rank the environment as an important issue for government, but are not as likely to demonstrate choices supportive of sustainability in their own lives. This may be changing somewhat: in a recent study *Better Happy than Rich*, Michael Adams (2000a), President of Environics, noted that “our purchases are becoming less conspicuous.... More of us are putting our money where our consciences are as we try to do business with humane and ethical organizations. Of course, some of us may be trying still to impress the neighbours, but the trend of the future is toward making personally meaningful purchases rather than flashy ones.” This may signal receptivity among Canadians to stronger social instruments that can stimulate and reinforce changes in attitudes and actions. However, the social instruments currently in place related to sustainable development are scattered, vary widely in terms of their intended audience, and often lack integration and long-term commitment. Pollution Probe’s 2002 study, *Making Informed Choices: Public Information and the Environment*, found that “large gaps in access to essential information remain and Canada lags leading countries such as the United States and New Zealand” (p. ii). One of the few environmental issues on which there has been concerted and consistent attention to social instruments federally has been in the area of public education and awareness of climate change.

The policy research literature on sustainable production and consumption is extensive. However, it focuses on mechanisms to stimulate cleaner production, the polluter pays principle, international negotiations on process and production methods, and so forth. In practice, the emphasis at the policy level in Europe has tended toward managing production considerations (e.g., the European integrated product policy⁴⁵) rather than on influencing consumer demand. On the demand side of the equation, most western agencies have invested to varying degrees in information instruments (e.g., US EPA’s “Envirofacts” warehouse,⁴⁶ the European Environment Agency’s “EnviroWindows,” designed to “facilitate consumer access to company information on products, best practices... and corporate environmental performance”⁴⁷). However, assessments of the effectiveness of these are difficult to find. The United Kingdom is one of the few countries to invest considerably in national social marketing campaigns (Helping Earth Begins at Home; Are You Doing Your Bit?), but with little, if any, demonstrable change in citizen behaviours (Hobson, 2002: 103). Fundamentally, we don’t know what has worked in the deployment of social instruments. Even in the established area of eco-labelling, a 2002 study of consumer support for the Nordic Swan⁴⁸ was one of the first empirical surveys of consumer reaction to labels. “When consumers in opinion polls are asked if their purchasing decisions would be influenced by information on environmental or ethical aspects of products, the majority seems very ready to say yes. However, evidence for actual behaviour along these lines is still limited” (Bjørner et al., 2002).

The traditional response to lack of public action is to provide more public information. For example, among their recommendations on public policy for sustainable consumption and production, Stratos suggested: “focus on indirect, information based levers such as...public access to information” (Moffat, 2000: 5). And yet we know from studies on smoking habits that information, education, and social marketing instruments alone don’t lead to changed behaviour. We have learned from the health sector that combinations of tools are needed and must work in concert. In addition to information, there needs to be access to new technologies (the provision of choices and tools, e.g., the nicotine patch) and supportive regulatory measures (e.g., antismoking bylaws).⁴⁹

Understanding the motivators to change is another important component in the design of social instruments. In a 1993 Canadian study, Ida Berger suggested a positive correlation between strongly held environmental attitudes and resulting behaviours, as long as citizens “personally experience environmental degradation or as long as reports of environmental problems are in the news.” But Berger (1993: 41) also noted that “environmental attitudes...are not stable.” Hobson (2002) presented the view that sustainable development cast in the context of issues of social justice leads to greater social transformation than does a focus on moderating individual consumerism. Yet another perspective emerges from the recent debate surrounding the ratification of the Kyoto protocol. The IISD recently completed a review for Environment Canada of Canadian reactions to the plan.⁵⁰ There are two findings relevant to this report.

- While a few respondents commented on the need to protect the environment, as part of a moral obligation or value system, this did not appear to be as significant a motivator as one might have expected. A few mentioned that international responsibility was important; a few noted the need to protect the world for our children; but the majority (even the Kyoto nay-sayers) were driven by the excitement of innovation, of being at the leading edge of a new way of doing things that would be good for the planet and would develop the economy in new directions.
- Citizens are less willing to take voluntary action unless they see positive examples set by government and, in particular, by business.

More recent approaches to social change communications around consumption suggest that focusing on individual choice will not be sufficient to effect the transformation of society to sustainability. Social instruments should lead to mutual change in preference to individual change; responses to instruments should be collective not just individual. A current Johns Hopkins study proposes methods “based on community dialogue and collective action that clearly specify social outcomes as well as individual outcomes...a horizontal sharing [of information] between two or more participants within social networks” (Figueroa, 2002: 3) rather than the channeling of information from government to individual. Carley and Spapens (1998: 167) describe this “action networking” as an instrument for social transformation: “The spread of life values...in which acquisition of goods becomes less important to life fulfillment, can only come about through social organization. This requires a strong feeling of community or participation in the sustainability project. ...Solving the dilemmas of overconsumption is mainly a social or political, rather than a household project.”

Research Needs

- **Strengthen evidence-based research on the effectiveness of social instruments in the environment and sustainable development field.** We simply don't know enough about how these instruments work to increase citizens' awareness of issues and whether, as a result, citizens have changed attitudes and actions over time. Consideration should be given to seeking out what evidence-based research exists or is underway, analyzing its policy implications, and supporting new research projects on the effectiveness of these instruments.
- **Investigate how sustainable development policy instruments can be combined more effectively.** Part of choosing an appropriate policy mix is gaining an understanding of the timing and integration of instruments: those instruments used to inform the public, that lead to the provision of choice (options for accessible and competitively priced environmentally friendly goods and services through full cost pricing, roll out of new technologies, etc.), and those instruments that lock the back door against continuing old behaviours (regulation and enforcement). As the OECD (2002: 141) has suggested, “a combination of instruments compensates for the weakness of any one type.”
- **Carry out research on what motivates Canadians to change.**
 - Social instruments that are based on the assumption that Canadians are motivated by messages on conservation and preserving the earth for our children may have much less impact than those instruments that recognize that Canadians are motivated by messages that highlight our creativity and innovation.
 - It is worth noting here that we do not yet well understand whether and how changes in the behaviours of companies influence consumer behaviour. What is the responsibility of business to help reduce the effort needed by citizens to live more sustainably?
- **Investigate communications and engagement approaches that stimulate collective responses.** Experience in the United Kingdom with its Sustainable Communities for the 21st Century program, the European Union's Citizens' Parliament on Sustainable Consumption, and the Sustainable Switzerland initiative should be analyzed. In these cases, “sustainable society discourses link up the moral citizen and personal experience with networked communities...through varied forms of overt and discrete social action” (Hobson, 2002: 105).

G. International Engagement: Poverty and Sustainable Development

Eradicating poverty is the greatest global challenge facing the world today and an indispensable requirement for sustainable development, particularly for developing countries (UN, 2002: 9).

Despite 50 years of efforts by development agencies, almost half of the world's population of six billion still lives below the two-dollar-a-day-poverty line. Poverty lies at the heart of resource access and sharing issues, welfare economics, and equity principles. Considered "misdevelopment" and a problem of developing countries by many, the increased integration of international economic forces means that poverty in developing countries is now affecting economic and political interests of developed nations even more significantly (Petras and Veltmeyer, 2002: 282). And these increasing intricacies are strongly influenced by a myriad of environmental concerns and international agreements that bind people of the world even closer together.

While there are many reasons behind the frustrating record of attempts at wide-scale poverty alleviation, two underlying factors are clear: the confusion between means and ends, and continuously changing policies driven by political and ideological interests. The result has been the development and implementation of policies ill suited to many developing countries. Moreover, the paradigm of fast economic growth has failed to alleviate poverty. There is also an emerging realization that the belief that poverty causes environmental degradation is too simplistic and, in many cases, just wrong. The linkages are more complex and have been found to be site-dependent. Therefore, any generalization of the links or the duplication of lessons learned from best practices must always be approached cautiously.

Canadian foreign policy and international commitments to sustainable development are deployed through such avenues as diplomacy, United Nations participation, official development assistance (ODA) to other countries, trade and investment abroad, and human security and peace building efforts (Lee, 2002: 1). This discussion focuses on trade and investment in developing countries and ODA, both having a range of impacts on the poor in developing countries. ODA, which is targeted at development projects in developing countries, is delivered through multilateral institutions, such as the World Bank, and multilaterally and bilaterally through the Canadian International Development Agency (CIDA).

Canada's ODA aims to support sustainable development in developing countries by reducing poverty and contributing to a more secure, equitable, and prosperous world (DFAIT, 1995). The consensus is, however, that the well intended international commitments made by Canada and other developed countries, supported by ODA, have not advanced sustainable development in developing countries (UN, Economic, 2002). While Canada's ODA was increased in 2003, an implementation gap remains between international commitments and capacity under current domestic policy and between objectives and results. Current commitments by Canada and the international donor community will not accomplish the goal of poverty alleviation to which they aspire.

Rationale for Inclusion

General level of impact on the quality of life of Canadians

Canadians share the global commons (e.g., air, oceans, and climate) with, and are connected to, other parts of the world through telecommunications, trade and investment, and humanitarian efforts. Problems of pollution and resource scarcity elsewhere also affect Canada. Furthermore, Canada is a strong participant in the UN, generally supporting multilateral efforts to attain security and peace worldwide and at home. Canadians already enjoy a good quality of life, and this can be enhanced by supporting and promoting sustainable development internationally.

Urgency with which the issue needs to be addressed

As world population increases, both poverty and environmental degradation also increase, especially in parts of the developing world. “While the environment plays a minor role as a direct cause of conflict, resource depletion plays an important role in creating or exacerbating human insecurities, deepening ethnic divides and straining governance and dispute resolution mechanisms” (Matthew et al., 2002: 11) Furthermore, resource depletion can undermine livelihoods, which can potentially feed tensions within and between communities and increased vulnerability to disaster as well as fuel conflict (Matthew et al., 2002: 390).

Probability that lack of resolution will lead to increased conflict and need for conflict management

Environmental stress can happen through unsustainable use of, and inequitable access to, resources and ecosystem services; when natural resources are used to finance conflict; when incompatible resource use leads to conflict over irreconcilable value systems; and when ecological services are undermined leading to increased vulnerability to disasters (Matthew et al., 2002: 390).

Scope of social significance

Poverty alleviation, at home or abroad, has long been important to Canada. Opinion polls have consistently shown over the past several decades that Canadians support humanitarian assistance (Pratt, 2001: 43). This sentiment is demonstrated by the maturity of the international development community in Canada, with many non-government organizations belonging to the Canadian Council for International Cooperation. Canadian social values, however, have narrowed over time to focus on national interests rather than the strong internationalist commitments of previous times that had influenced Canadian development assistance (Pratt, 2001: 50). As a result, support for Canada’s international poverty alleviation efforts has not reached the peak levels experienced in the 1960s and 1970s for some time.

International commitments and obligations

Poverty alleviation is a key principle of sustainable development and is the primary goal of recent international agreements, such as the United Nations Millennium Development Goals (UN, 2003), the World Summit on Sustainable Development Plan of Implementation, and the New Economic Partnership for Africa’s Development on which Canada based the Canada Action Plan for Africa following the 2002 G-8 meeting. Relieving, reducing, and ultimately eradicating⁵¹ global poverty is requisite for sustainable development and since the Marshall Plan to revitalize Europe after World War II, ODA has been widely accepted as a primary method for addressing poverty eradication and other linked issues (Pratt, 2001: 43).

The first Millennium Development Goal aims to eradicate extreme poverty and hunger, with the initial target of halving, between 1990 and 2015, the proportion of people whose income is less than \$1 a day. In addition, by agreeing to the WSSD Plan of Implementation, Canada has recognized “that a substantial increase in ODA and other resources will be required if developing countries are to achieve the internationally agreed development goals and objectives, including those contained in the Millennium *Declaration*” (WSSD, 2002: 37). Furthermore, this would be accomplished by achieving the goal of 0.7 percent of GNP as ODA (paragraph 79). Specific to Africa, the *WSSD Plan of Implementation* acknowledges that poverty remains an obstacle to sustainable development and the benefits globalization can accrue (paragraph 56).

In 2001, the OECD Development Assistance Committee review of Canadian ODA recommended enhanced mainstreaming of poverty reduction and noted there is a “paradox in Canada’s internationalism,” given that it is determined to engage in a wide range of issues, but does not have or provide the funding to accomplish these aspirations.⁵² While ODA volume is one indicator of the level of commitment to poverty reduction, the focus on cooperation is another. Having established the link between poverty and sustainable development – that the latter is not plausible in the presence of the former – the challenge has moved from engaging donor countries on the topic of ODA, to a focus on cooperation and policy planning to deliver sustainability.

Currently, trade flows and foreign direct investment are greater than ODA and often unfavourably impact on the poor in developing countries (IISD,2002). This has resulted in a call for the members of the WTO to take development impacts into consideration and much hope was placed on the WTO Fourth Ministerial held in Doha in late 2001. While development issues were found throughout many parts of the Doha Declaration, “no negotiations on trade and development as a specific issue are foreseen” (Moltke, 2002: 1).

Change potential

ODA and trade and investment flows are governed by such international organizations as the United Nations, OECD, various development agencies and the WTO in centres frequently far removed from local-level communities. While much development policy is made at these macro levels of government, the impact of those decisions is felt by individuals at local levels where there is a more direct connection to ecosystems and the resources they provide. Hence, there is a need to design adaptive policies and instruments for development that link international intentions and individual needs. The development and deployment of technologies, analytical tools and specific policy measures require, however, ongoing inquiry to bridge the evolving gaps between present knowledge and future goals of development.

Research Review

The development agenda has largely evolved separately from the environmental agenda with research taking place in one sphere, and sometimes giving nominal reference to the other.⁵³ The task of linking the two has met with failure more often than success resulting in this historic divide spilling over into how ODA is targeted and delivered (Duraiappah, 2002b: 1-2). In addition, the field of international development is rocked by a plethora of development strategies and foreign policy interests, which change while poverty and inequality linger (*Economist*, 1999: 24).

In general, the integration of poverty and environment issues has not been tackled systematically by the donor community and has yet to make its way into development cooperation policies and strategies. Earlier work on sustainable livelihoods, which was adopted by the United Nations Development Programme and the UK Department for International Development, appears to have been replaced by an approach consistent with the World Bank's poverty reduction strategy papers (PRSPs), motivated by the Development Assistance Committee (DAC)'s decision to harmonize development cooperation across development agencies. CIDA also considers PRSPs to be one of their most important programming instruments (CIDA, 2002: 7).

The poverty-environment nexus is, however, being developed by others. More specifically, the United Nations Environment Programme (UNEP) has moved ahead in developing guidelines for poverty alleviation through ecosystem management (Duraiappah, 2002a). This conceptual framework and guidelines are also being used in the Millennium Ecosystem Assessment (Millennium, September 2003). Based on Nobel Laureate Amartya Sen's freedoms and capabilities framework, these guidelines provide “a more accommodating conceptual framework embracing the principles of sustainable development than the neo-classical economic paradigm,” which currently drives international development efforts (Duraiappah, 2002b: 2). In the freedoms and capabilities framework, there are five instrumental freedoms that, if present, and if people have access to them, will provide opportunities for people to act in their own self-interest and reduce their vulnerability. All these instrumental freedoms, namely political freedom, economic facilities, social opportunities, transparency guarantees, and protective security, and the resources to exercise these rights, are necessary if people are to acquire the capabilities they need for a better quality of life. One other instrumental freedom – ecological security – has been contributed to the literature on freedoms and capabilities by the IISD (Duraiappah, 2002a: 27-36).

Canada's delivery of ODA has been subject to extensive criticism. Some foreign aid analysts see the main problem as being a focus on a mix of foreign and domestic policy concerns rather than poverty alleviation, and are especially critical of ODA's support of the Canadian private sector or civil society initiated stand-alone projects (CCIC, 1999: 1). Unfortunately, this type of compromise approach leads to situations where the needs of the poor are pitted against perceived Canadian interests (CCIC, 1999).

The OECD Development Assistance Committee (DAC), of which Canada is a member, maintains that developing country governments and civil society must drive the development process, as donor-driven initiatives rarely take root (OECD, DAC, 1996: 15). They also note that DAC members need to coordinate their development strategies for any particular country with each other and other multilateral institutions, with the goal being a reduction in the need for aid (OECD, DAC, 1996). This need is reiterated more fully in the DAC's 2001 report, which sets out how OECD donors are trying to develop policy coherence through the Millennium Development Goals, in trade negotiations, by untying ODA,⁵⁴ and within the OECD (Faure, 2001: 33-45).

CIDA has recently taken steps to increase and untie ODA and has made poverty reduction a central issue of two strategic documents – their Sustainable Development Strategy and Social Development Priorities (OECD, DAC, 2002: 33). CIDA's recent document, *Strengthening Aid Effectiveness* (CIDA, 2002), identifies five principles of effective development. However, the DAC peer review of Canada (OECD, DAC, 2002: 33) recommends enhanced mainstreaming of poverty reduction.

Research Needs

- **Identify the links between poverty and the environment at the local level.** Research is required to identify the key factors that will advance sustainable development, such as conservation techniques and environmental management approaches that can create new livelihoods, or the types of institutional reform at various levels that will reinforce the rights and freedoms necessary for individuals to improve their quality of life.
- **Identify the sustainable development goals of developing countries and assess how Canada can contribute to an agenda for change that bridges the gap between northern and southern perspectives.** The recent dialogue on Canadian foreign policy initiated by Minister Graham notes: “Our future is inextricably linked to the future of others beyond our borders” (DFAIT, 2002a). To achieve more effective progress on international cooperation and poverty alleviation, the aspirations of developing countries must be understood and addressed through Canada's official development assistance and capacity development efforts.
- **Assess the effectiveness of programs to improve developing country capacity to participate effectively in the multilateral system.** One developed country commitment that extends as far back as Rio is the design and delivery of programs to improve developing country capacity to participate effectively in the multilateral system. Many initiatives have been undertaken, but no comprehensive assessment of how well they are working has been done.
- **Examine how international trade and investment can contribute optimally to the achievement of sustainable development.** Over the years, trade and investment flows have become far more significant sources of revenue for developing countries than official development assistance. But they have not always resulted in improved livelihoods or a better quality of life for the poor. Further work is needed on how agreements and institutions can be structured to ensure pro-poor development.
- **Assess donor efforts at policy coherence and donor coordination.** Vague international commitments like those agreed to in the WSSD Plan of Implementation, the Millennium Development Goals and NEPAD must be followed by made-at-home domestic plans for meeting Canadian commitments. A continuing challenge and potential research need relates to coordination and cooperation, domestically and internationally. On the topic of linking domestic policy to diplomacy in the sustainable development realm, CIDA has suggested that a better understanding of country-specific and local poverty characteristics, a better coordination of project, program, and institutional support, and a clear view of CIDA's role and capacity are required (CIDA, 1996: 2).

Concluding Comments

The goal was to define five to ten policy-relevant issues to advance sustainable development in Canada and provide an overview of needed research for each. The seven issues put forward vary in their level of specificity and in the amount of policy research that has been done. Even though many of these issues have been written about extensively, they have not been examined through the lens of sustainable development to a great extent. It is evident that there is still extensive policy research that needs to be done on these issues to accelerate Canada's progress toward meeting its sustainable development commitments and achieving a more sustainable quality of life.

One of the more difficult challenges was deciding on the level of specificity for each issue. For the most part, the substance of the issue and research needs have been described. They still need further interpretation and discussion, however, before a research agenda can be determined.

The preference was to take a "place-based" approach for the first four issues. This follows from the understanding that the environment does not stop at jurisdictional boundaries. To advance sustainable development, we need to learn to both read signals from the environment and respond to these signals better. To do this, it is necessary to communicate across boundaries. This is a tremendous challenge, given the dynamics of politics and rate of change today.

Most of these issues have been on the national and international agendas since the Stockholm conference in 1972. This raises several questions for consideration.

1. Many of these issues have been on the agenda since Stockholm, Brundtland, and Rio. Why have we not made more progress?
2. The integration of environmental and economic signals is still a challenge. Why is it so difficult?
3. Changes in lifestyles are fundamental to achieving sustainable development. How can we learn more from the social and behavioural sciences, and integrate that knowledge into policy development?
4. Can we provide enough ecological and political space for developing countries to achieve sustainable development while enhancing our own standard of living and not threatening critical global systems?

Appendix A: Background and Methodology

The Policy Research Initiative of the Government of Canada contracted with the International Institute for Sustainable Development in March 2003 to provide input to the PRI Research Project on Sustainable Development. PRI, active in the areas of governance, trade and environment, and corporate social responsibility, requested a broader scan from external experts on the key sustainability challenges facing Canada in the mid to long term. Of particular interest to the PRI is the “research gap”: what research is needed to address identified issues, and how that research can be integrated into the policy development process.

The intent of this exercise was to initiate discussion on a possible sustainable development research agenda, which could be taken up by interested federal government departments. The first phase of this discussion took place at a workshop held March 28, 2003, in Ottawa where the paper was presented to a group of representatives from various federal government departments. Workshop attendees then sent comments to the IISD, which were considered in the May 7, 2003, revised draft of the paper prepared for the PRI – Social Sciences and Humanities Research Council (SSHRC) Policy Research Forum Round Table on Sustainable Development, held in Ottawa. The purpose of the Round Table was to discuss policy research priorities for advancing sustainable development in Canada. Comments from discussants and attendees were considered for this final version of the paper.

The research objectives were to:

- identify five to ten key sustainable development issues facing Canada in the mid to long term stating why each is a priority for Canada and what would happen if the issue is not addressed in a timely manner; and
- review the current research on each issue and identify the “research gap” on which policy-makers could build their policies and programs.

Methodology

1. Identification of the issues

The issues were identified at a half-day brainstorming workshop held in late February 2003, attended by 10 senior IISD researchers in person and by conference call. Collectively, the group represented several decades of experience with some members being at the vanguard of sustainable development in Canada.

The first step was to scan and briefly scope the full range of sustainable development issues considered relevant to Canada. To do this, each participant was asked to list five issues they considered to be of mid- to long-term concern for Canada and table them at the workshop. The participants debated the resulting list of over 35 issues to clarify their meaning and importance. Most of the issues were then aggregated into a shorter list of 10 issues with further debate eliminating three issues deemed slightly less important by the group. The remaining seven issues that are included in this paper are:

- urban redesign;
- freshwater management;
- eco-region sustainability;
- impacts of globalization on Canada;
- signals and incentives;
- unsustainable lifestyles; and
- international engagement on poverty and sustainable development.

2. Definition of scope of selected issues

Scope notes were written for each of the seven selected issues and sent to the workshop participants and to the PRI for comments.

3. Review of issues against criteria

Six criteria based on the research objectives and public policy theory⁵⁵ were developed and used to screen the selected issues to test their viability.

Selected Criteria:⁵⁶

- General level of impact on the quality of life of Canadians.
- Urgency with which the issue needs to be addressed.
- Probability that lack of resolution will lead to increased conflict and need for conflict management.
- Scope of social significance (low: has the attention of a small group; high: has the attention of the general public).
- International commitments and obligations.
- Change potential: the likelihood that attention to this issue will lead to changes toward sustainable development.

4. Issue definition, state of the research and gap identification

A policy analyst was assigned to each issue and asked to address the following.

- Definition and scope of the issue.
- Rationale: why the issue is a priority for Canada using the criteria outlined above; how this issue relates to Canada's commitments coming out of the World Summit on Sustainable Development and other international regimes; and how this issue can be seen to be a leverage point for sustainable development within a broader framework of complex adaptive systems.
- Research review: what the current research on the issue tells us.
- Research needs: what further policy-relevant research needs to be carried out (identifying the "research gap").

5. Peer review by the PRI and IISD

The draft paper was reviewed externally by PRI staff and internally by David Runnalls (IISD's President), Dr. Arthur J. Hanson (Distinguished Fellow and Senior Scientist), and Dr. Peter Hardi (Senior Fellow).

6. PRI workshop on March 28, 2003

The paper was first presented and discussed at a workshop organized by the PRI on March 28, 2003, in Ottawa and attended by representatives from several federal government departments.

7. Submission of comments from workshop attendees

All workshop attendees were invited to submit comments on the paper, which were then considered for the May 7, 2003, revision of the paper.

8. PRI – SSHRC Round Table on Sustainable Development on May 7, 2003

Following a presentation by the IISD, the May 7, 2003, revised draft of the paper was used to launch the Round Table discussion. Two discussants, Glen Toner of Carleton University and Ann Dale of Royal Roads University, commented on the paper prior to the general Round Table discussion.

The paper has been greatly strengthened by an ongoing and useful discussion with the PRI. This final version takes into account some of the comments arising from the PRI-SSHRC Round Table, as well as further feedback from PRI staff.

Selecting the issues proved to be a challenging exercise, as several important trends and issues in sustainable development were subsequently left out of this research paper. The reasons for leaving some out and choosing others were varied. In some instances, issues were aggregated together. Others, though important, were deemed to illustrate gaps in implementation rather than policy, or were being addressed in the short term (and therefore outside the stipulated timeframe of mid- to long-term concern). And, the issue of climate change was not included at the request of the PRI. While the criteria situated the issues in the present, there is a high probability that these issues will remain relevant for some time, even with quick and focused action.

Appendix B: About the IISD and Contributors

About the IISD

The International Institute for Sustainable Development contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change, measurement and indicators, and natural resources management. By using Internet communications, the Institute reports on international negotiations and brokers knowledge gained through collaborative projects with global partners, resulting in more rigorous research, capacity building in developing countries, and better dialogue between North and South.

The IISD's vision is better living for all – sustainably. Its mission is to champion innovation, enabling societies to live sustainably. The IISD receives operating grant support from the Government of Canada, provided through the Canadian International Development Agency (CIDA), Environment Canada, and from the Province of Manitoba. The institute receives project funding from the Government of Canada, the Province of Manitoba, other national governments, United Nations agencies, foundations, and the private sector. The IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States.

Biographies of Contributors to the Paper

Stephan Barg

Senior Corporate Advisor and Senior Project Manager, Economic Policy

Steve Barg has been with the IISD since its inception in 1990. His research has focused on the interconnections between government and corporate policy, and the tools used in each arena to foster sustainable development. This work builds on his previous experience as a government finance official and as a corporate finance and planning executive. He has a bachelor of science from McGill University (1969) and a Master of Philosophy (Economics of Public Finance) from England's University of York (1974). His research focus is economic instruments, and how governments can use them to help economies move toward sustainable development. In particular, taxation and expenditure policies of governments in Canada and India, and the reduction of perverse subsidies are active projects.

Heather Creech

Director, Knowledge Communications

Heather Creech is the Director of Knowledge Communications at the IISD, responsible for the delivery of IISD's knowledge and the integration of its knowledge with that of other organizations through partnerships, networks, and alliances. She brings to her work extensive experience in Canada and the South Pacific, establishing networks and providing information and training services in the legal and marine science fields.

Creech is an adjunct professor at the Natural Resources Institute, University of Manitoba, a member of Canada's Ocean Management Research Network, and a member of the Advisory Committee, International Development Studies, Menno Simmons College (University of Winnipeg). She holds a certificate from the Sustainable Enterprise Academy, Schulich School of Business, York University, has taken graduate political science studies in ocean policy at Dalhousie University (Halifax), and holds an M.L.S from Dalhousie University (Halifax), and a Bachelor of Arts (Hons.) from Queens University (Kingston).

William H. Glanville
Vice-President and Chief Operating Officer

Bill Glanville joined the International Institute for Sustainable Development as Vice President and Chief Operating Officer in February 1998. He is responsible for the overall direction and coordination of the Institute's research activities and achievement of its strategic objectives. He is also responsible for leading the ongoing strategic planning process within the IISD. He serves on the Board of Trustees of the Institute for Global Environmental Strategies in Japan. Prior to coming to the IISD, Dr. Glanville worked for 28 years in the field of post-secondary education in Alberta. Most recently he served as academic vice-president and other executive positions at the Northern Alberta Institute of Technology in Edmonton. Dr. Glanville's educational background is in chemistry, science education, and educational administration; he is a graduate of McGill, Harvard, and the University of Alberta.

Arthur J. Hanson
Distinguished Fellow and Senior Scientist

Dr. Hanson served as president and CEO of the IISD for seven years (1991-98). He is Distinguished Fellow and Senior Scientist. Dr. Hanson is a board member of the China Council for International Cooperation on Environment and Development, an Advisor to the Volvo Environment Prize, a member of the Selection Committee for the North American Fund for Environmental Cooperation and serves on numerous Canadian and international environment and development committees. In May 1994, he was appointed by the Prime Minister of Canada to the National Round Table on Environment and Economy. He holds a PhD from the University of Michigan in the field of fisheries ecology and natural resources, an MSc in zoology/fisheries and a BSc (First Class Hons.) in zoology from the University of British Columbia.

Howard Mann
Associate and Senior International Law Advisor

Howard Mann is a practising lawyer and the Senior International Law Advisor to the IISD. He now coordinates the IISD Investment Program. He has a PhD in international law from the London School of Economics, and was a negotiator of several international environmental agreements for Canada prior to becoming a private sector lawyer and part of the IISD team. He is also an adjunct professor of international law at the University of Ottawa Faculty of Law. Howard specializes in international sustainable development law, with a particular focus on international trade, investment and environmental law, and legal policy. He is widely published in these areas, and is a frequent participant at international conferences, including most recently the 2003 American Society of International Law Annual Meeting. He is frequently called upon to assist different international governmental and non-governmental organizations on the development of international investment agreements for sustainable development. Howard's legal analysis of NAFTA's investment chapter from a sustainable development perspective remains a leading publication in this field.

Jo-Ellen Parry
Manager, Climate Change and Energy

Jo-Ellen Parry works as a Manager in the Climate Change and Energy Strategic Objective. She is the Coordinator of the IISD's climate change activities and within this role she has provided analysis and information support services for the Secretariat of the Manitoba Climate Change Task Force and liaised with members of the Task Force Secretariat and the provincial government working group. Prior to working at the IISD, Jo-Ellen worked with a local NGO to coordinate, facilitate, and analyze public deliberation forums on globalization for Manitoba youth at the Grade 12 and university levels. She has also held several research positions with various academic, NGO, and private organizations, and has worked internationally in Ghana and Pakistan. She holds a master of environmental studies degree from York University specializing in community-based resource management, and a bachelor of science in environmental science from the University of Manitoba.

László Pintér
Director, Measurement and Indicators

László Pintér is Director of the IISD's Measurement and Indicators Strategic Objective. László has been with the Institute since 1994 and helped set up its program on measurement and indicators. He conceptualized, contributed to, and led projects with emphasis, among others, on state of the environment and sustainability reporting, sustainable development indicators, performance evaluation, and integrated assessment in place-based, sectoral or global contexts. During 2000-2001 he spent 10 months as a Global Environmental Assessment Practitioner Fellow at the Kennedy School of Government of Harvard University, where he carried out research on the relationship between global integrated environmental assessment system design and effectiveness. Pintér holds a diploma in agronomy (1988) from the Gödöllő University of Agricultural Sciences, Hungary, a master of natural resources management (1994) from the University of Manitoba, Canada and a PhD from the University of Minnesota (2002). Prior to joining the IISD he worked in the biotech industry as marketing director for Diagnostic Technology, Inc. in the United States and as marketing director for Deltaco RT in Hungary.

Marlene Roy
Information Resources Coordinator

Marlene Roy is responsible for the development and management of the IISD's Research Library, a clearinghouse for sustainable development policy and research and SD-Cite, a database of sustainable development information and knowledge sources. She has been responsible for the development and publication of several current awareness tools on sustainable development including the *Weekly Journal Review* listserv and *Developing Ideas Digest*. Prior to joining the IISD, Roy operated a market research and communications business for several years and has 20 years' experience in developing and managing corporate libraries covering such fields as engineering, architecture and interior design, and economic development. She has sat on the Board of the Women's Legal Education and Action Fund (LEAF) in Manitoba, the Professional Marketing Research Society in Manitoba and, more recently, the Canadian Association of Special Libraries and Information Services (CASLIS) Manitoba. Ms. Roy holds a master of arts degree in geography from the University of Manitoba.

David Runnalls
President & Chief Executive Officer

David Runnalls is President of the IISD and also serves as co-chair of the China Council Working Group on Environment and Trade. Runnalls has served as senior advisor to the president of the International Development Research Centre in Ottawa, Canada, and to the administrator of the United Nations Development Programme. Previously, he was director of the Environment and Sustainable Development Programme at the Institute for Research on Public Policy in Ottawa. Runnalls was the Canadian board member of IUCN-the World Conservation Union for six years and the Chair of the Committee for the World Conservation Congress in 1996. He is a member of the boards of the World Environment Center (New York), IIED (London), and Pollution Probe (Toronto). An occasional writer and broadcaster, he has served as environment columnist for CBC radio and for CTV as well as being a member of the Discovery Channel's regular environment panel.

Henry David Venema
Research Associate

Henry David Venema is a professional engineer with extensive experience in water resources, natural resources, and energy sector planning in North America, Africa, and Asia. Mr. Venema is a gold medalist in physics and civil engineering from the universities of Winnipeg and Manitoba respectively. Venema also holds a master's degree in water resources engineering from the University of Ottawa and is a PhD candidate in systems design engineering from the University of Waterloo where he has been both an NSERC 1967 Science and Engineering Scholar and IDRC Doctoral Research Scholar. Venema's research on systems approaches to climate change mitigation and adaptation has appeared in the *Journal of Environmental Management* and *Mitigation and Adaptation Strategies for Global Change* and has been widely cited by the IPCC's *Third Assessment Report on Climate Change Impacts, Adaptation and Vulnerability*. His research has also appeared in the water resources, hydrology, and renewable energy literature. His PhD research concerns landscape-based systems models for integrated rural development and climate change mitigation and adaptation.

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Appendix C: Clustered Issues from the IISD Staff Workshop

Freshwater management

- Quantity, quality, transboundary management, privatization, and pricing
- Multiple impacts including hydrological changes, climate change, and nutrient load

International engagement

- International obligations including those related to the WSSD and WEHAB
- Innovative instruments to deliver on Kyoto, CBD, and other obligations
- How does Canada help developing countries in the transition to sustainable development?
- Canada's sustainable development positioning with respect to China, the United States, the European Union (and Russia)

Regional eco-security

- Threats to prairie ecosystems and agricultural livelihoods
- Habitat loss and degradation, and loss of ecosystem services
- Boreal forest
- Ocean sustainability
- Arctic ecosystems

Signals and incentives

- Metrics and their application for sustainable development
- Improve efficiency of resource use
- Economic instruments and their application
- Internalize externalities
- Energy pricing and shift to renewables

Societal transformation

- Encouraging change in consumption patterns and societal behaviour patterns
- Education for the future – sustainable development materials for schools and the public; education of the next generation of decision makers; overall improvement of formal education system; continuing education/lifelong learning
- Moving beyond research to action

Urban redesign

- Infrastructure
- Sustainable transportation
- Urban sprawl
- Urban poverty and homelessness
- Strengthening community capabilities for change

Vulnerability and opportunities of globalization

- Impact of trade and investment on sustainable development
- Corporate responsibility and the public good, at home and abroad
- Link information, society, and sustainable development agendas
- Link innovation and sustainable development agendas
- Transboundary governance

Other issues raised

Aboriginal issues

- Education, poverty, health, access, and rights to resources

Change management

- Road maps and scenarios
- Ecologic-economic models
- Public sector science and monitoring
- Putting the “d’ back in “r&d”; rolling out new sustainable technologies
- Decentralized, polycentric decision making

International security

Toxics and health/ health and environment

Transition to a biological economy

(i.e., an economy based on a knowledge of life’s processes)

Appendix D: Acronyms

AAFC	Agriculture and Agri-Food Canada
APEC	Asia Pacific Economic Cooperation
BIT	Bilateral Investment Treaty
CBC	Canadian Broadcasting Corporation
CCIC	Canadian Council for International Cooperation
CEC	Commission for Environmental Cooperation
CESD	Commissioner of the Environment and Sustainable Development
CIDA	Canadian International Development Agency
CMHC	Canada Mortgage and Housing Corporation
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSD	Commission for Sustainable Development (United Nations)
CWRA	Canadian Water Resources Association
DAC	Development Assistance Committee (OECD Department)
DFAIT	Department of Foreign Affairs and International Trade (Canada)
DFID	Department for International Development (United Kingdom)
EC	Environment Canada
EEA	European Environmental Agency
EPA	Environmental Protection Agency (United States)
EU	European Union
FCM	Federation of Canadian Municipalities
FTAA	Free Trade Area of the Americas
GATS	General Agreement on Trade in Services
GDP	Gross Domestic Product
GEO	Global Environment Outlook
GNP	Gross National Product
GST	Goods and Services Tax
GWP	Global Water Partnership
HC	Health Canada
HDI	Human Development Index
ICLEI	International Council for Local Environmental Initiatives
IISD	International Institute for Sustainable Development
IUCN	World Conservation Union

IWRM	Integrated Water Resources Management
NAFTA	North American Free Trade Agreement
NEPAD	New Economic Partnership for Africa's Development
NRCan	Natural Resources Canada
NRTEE	National Round Table on the Environment and the Economy (Canada)
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
PFRA	Prairie Farm Rehabilitation Association (Canada)
PRI	Policy Research Initiative
PRSP	Poverty Reduction Strategy Paper (World Bank)
RIIA	Royal Institute for International Affairs
SD	Sustainable Development
SPS	Sanitary and Phytosanitary Standards
TGEAES	Task Group on Ecosystem Approach and Ecosystem Science (Environment Canada)
TRIMS	Trade Related Investment Measures
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCHS	United Nations Conference on Human Settlements (Habitat II)
UNCTC	United Nations Centre for Transnational Corporations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USEPA	United States Environmental Protection Agency
USNRC	United States National Research Council
WCED	World Commission on Environment and Development
WEHAB	Water, Energy, Health, Agriculture, and Biodiversity (United Nations)
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WWAP	World Water Assessment Programme
WWC	World Water Council

Notes

- 1 Please refer to IISD's Sustainable Development Timeline for more information on the historical path of sustainable development available at http://www.iisd.org/pdf/2002/sd_timeline2002.pdf. Accessed October 15, 2003.
- 2 There have been other Canadian initiatives, including the Nunavut Sustainable Development Department and Manitoba's proposed Sustainable Development Act, both of which are in the initial stages of implementation.
- 3 IISD (1999). The issues are unsustainable consumption, corporate responsibility, urban growth, trade and environment, poverty, biodiversity decline, freshwater, food security, climate change, and health.
- 4 A growing body of research on complex adaptive systems includes Gunderson and Holling (2002); Costanza and Jorgensen (2002).
- 5 Based on Canadian census data and cited in Bradford (2002: 3).
- 6 Gertler as cited in Bradford (2002: 6).
- 7 "The ecological footprint is the corresponding area of productive land and aquatic ecosystems required to produce the resources used, and to assimilate the wastes produced, by a defined population at a specified material standard of living, wherever on Earth that land may be located" (Rees, 2000).
- 8 The two reports were presented at Habitat II, the second United Nations Conference on Human Settlements held in 1996 in Istanbul, with the conference resulting in agreement by governments on the Habitat Agenda, which contains a global plan of action and the WSSD report (Earth Summit, 2002).
- 9 Probe Research (2003: 2). A press release from the Federation of Canadian Municipalities (FCM, 2003) after the release of the 2003-2004 federal budget stated that this budget did "nothing to alleviate pressure on crumbling community infrastructure and gridlock."
- 10 Major groups are identified in Agenda 21 as women, children and youth, indigenous people, non-governmental organizations, local authorities, workers and trade unions, business and industry, the scientific and technical community, and farmers.
- 11 Resiliency is "measured by the magnitude of disturbance that can be absorbed before the system changes its structure by changing the variables and processes that control behaviour (Gunderson and Holling, 2002: 28).
- 12 Graham et al., (1998: 261). There have been some urban sustainable development initiatives that should be noted. Hamilton-Wentworth is often cited as the best example of urban sustainable development in Canada. The Federation of Canadian Municipalities has been publishing a best practices guide since 2001 and the Canada Mortgage and Housing Corporation has been active in promoting urban sustainable development since the early 1990s. While these initiatives are positive steps, it is not yet known if they have created a critical mass for change.
- 13 See NRTEE (1998) for a detailed discussion of the many challenges in brownfield development.
- 14 Ecological fiscal reform is defined as "a strategy that redirects a government's taxation and expenditure programs to create an integrated set of incentives to support the shift to sustainable development" (NRTEE, 2002: 5).
- 15 For a complete list of priorities, see NRTEE (2003a).
- 16 Embodied energy is a measurement of the energy used in production of building materials and the building itself (Smith et al., 1998: 71).
- 17 For information on energy efficiency in Canada see NRCan (nd).
- 18 Some information on Canadian initiatives can be found at CMHC (2001).
- 19 Some preliminary work on sustainable development and quality-of-life indicators has been done by the IISD. See City of Winnipeg Quality of Life Indicators (IISD, nd).
- 20 While writing this report, CMHC released a new residential street design called "fused grid," which captures many sustainable development principles with it being applied in two areas to date: Stratford, Ontario and one Toronto subdivision (Bryksa, 2003).

- 21 Sustainability criteria are not mentioned at the Web site on Canada's building codes at: <http://www.nationalcodes.ca/ncd_home_e.shtml>. Accessed October 15, 2003.
- 22 Health Canada *Guidelines for Canadian Drinking Water Quality* set limits on potentially harmful microbiological, chemical, and radiological contaminants in potable water supplies.
- 23 As quoted in Rance (2003).
- 24 Rance (2003). A good source of information on water problems in Canada can be found in Environment Canada (2001).
- 25 The Global Water Partnership is a working partnership among all those involved in water management: government agencies, public institutions, private companies, professional organizations, multilateral development agencies, and others committed to the Dublin-Rio principles.
- 26 There is a full discussion in UNESCO (2002: 325-342).
- 27 An eco-region is defined as "a relatively large area of land or water that contains a geographically distinct assemblage of nature communities...[which] share a large majority of their species, dynamics, and environment conditions, and function together effectively as a conservation unit at global and continental scales." Dinerstein et al. (1995) as cited in Ricketts et al. (1999: 7). See also CEC (1997: 9) for a map of eco-regions.
- 28 Habitat is defined as "all the elements of the Earth that are used by wildlife species to sustain themselves throughout their life cycles. This includes the spaces (i.e., terrestrial and aquatic) that they require as well as the properties of those places (e.g., biota, climate, soils, and so on) (Wildlife Habitat Canada, 2001: 1).
- 29 Bailey (1996) as cited in Ricketts et al. (1999: 2).
- 30 Canada. Bill C-5. 37th. Parliament 1st. session, June 11, 2002.
- 31 The Canadian Biodiversity Strategy lists some of these (EC, 1995).
- 32 Batie as cited in Wilson and Tyrchniewicz (1995: 47).
- 33 By "trade policy" here we mean those elements of policy covered in international trade agreements. This goes beyond trade in goods and services to include investment, intellectual property rights, government procurement, competition policy, and so on.
- 34 Canada (1999). 1v. in various pagings. Also, Canada has been innovative in its institutional responses to sustainable development at the federal level, including the roundtables and the commissioner for sustainable development. Art. 2 of the Treaty Establishing the European Community, the section that largely governs the policies of the European Union, sets as the task of the Community "...to promote throughout the European Community a harmonious, balanced and sustainable development of economic activities..." This binding provision has been the source of extensive efforts with the EU to develop more pragmatic approaches to sustainable development.
- 35 The CEC has done pioneering work on this subject. See, for example, CEC (2002). Also see the body of studies conducted by UNEP, at <<http://www.unep.ch/etu/etp/acts/capbld/cp.htm>>. Accessed October 15, 2003. IISD has also conducted a fair amount of research in developing countries, through the Trade Knowledge Network, at <<http://www.tradeknowledgenetwork.net>>. Accessed October 15, 2003.
- 36 Negative externalities occur when the welfare of either a consumer or producer is adversely affected by the actions of the other, and these adverse impacts go uncompensated (Venema et al., 2002: 3).
- 37 Examples can be found in Gale et al. (1995).
- 38 Some sources of information on this are the EEA (2000); Ekins (1999). On a purchasing power parity basis, Canada produces \$3.30 gdp / kg of oil equivalent. Corresponding number for Germany is \$6.10, for France \$5.40 and for the UK \$6.00 (World Bank, 2003: 150).

- 39 Hodge (1995) as cited in Pintér (2002: 5).
- 40 Dashboard of Sustainability can be found on the Internet, at: <http://www.iisd.org/cgsdi/intro_dashboard.html>. Accessed October 15, 2003.
- 41 Environmental Sustainability Index can found on the Internet, at <<http://www.ciesin.columbia.edu/indicators/ESI/>>. Accessed October 15, 2003.
- 42 Economic instruments include assigning property rights, establishing tradable access/emission/use/development rights, tax or subsidies, access charges, and performance bonds or legal liabilities (UNEP, 2002b: 3).
- 43 Comment, Dan Fullerton, Dean, Business Development, Olds College, Alberta.
- 44 For a critical assessment of the ecological footprint and measurement issues please see Jorgensen (2002).
- 45 For an overview, case studies, and access to the policy paper, go to <<http://www.bsdglobal.com/issues/ipp.asp>>. Accessed October 15, 2003.
- 46 <<http://www.epa.gov/enviro/>>. Accessed October 15, 2003.
- 47 <<http://www.eea.eu.int/networks>>. Accessed October 15, 2003.
- 48 The Nordic Swan is the Nordic Council's ecolabel, comparable to Environment Canada's Environmental Choice program and its Ecologo and the European Union Flower.
- 49 Manifest. Presentation at Climate Change Hub Pilot Advisory Team workshop (organized by Environment Canada), September 2002.
- 50 Unpublished: the report is under review by Environment Canada.
- 51 CIDA distinguishes between poverty "relief" and "reduction," the former addressing immediate problems to meet basic survival needs, the later referring to the process by which the sustainable livelihoods and eliminating the cycle of poverty are addressed (CIDA, 1996).
- 52 There is clear indication that this trend is reversing. After years of cuts in ODA, the February 18, 2003 budget indicated a reverse to this downward trend, fulfilling the Prime Minister's commitment to increasing ODA by eight percent in 2003. The International Assistance Envelope for the year ending March 2003 was also increased by \$373 million.
- 53 The World Bank's poverty reduction strategy papers nominally mention the environment (Muyatwa, 2002).
- 54 Tied aid is defined as ODA that restricts purchasing of goods and service of recipients to certain countries, usually that of the donor. It is generally argued that untied aid is a more efficient way to deliver assistance (Faure, 2001: 40).
- 55 Criteria adapted from Parsons (1995).
- 56 The first two criteria are based on the research objectives and the last criterion on change potential is self-explanatory. The criteria on conflict and social significance build on the Cobb and Elder model of issue and agenda formation. They see issues as arising out of conflict between two or more groups (potential for increased conflict) and agenda-building occurring as a result of the expansion of an issue from a specifically concerned attention group to a wider interested or attentive public. (Scope of social significance: the more socially significant an issue is defined to be, the greater the likelihood that it will be expanded to a larger public.) For further explanation see Parsons (1995: 127-129).

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