External Affairs and International Trade Canada

A QUALITATIVE REVIEW OF THE ECONOMIC IMPLICATIONS OF AGENDA 21

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Canada

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EXECUTIVE SUMMARY

The Agenda 21 document was one of the main products of the June 1992 United Nations Conference on Environment and Development (UNCED). The document is comprised of some 500 pages, and contains hundreds of recommendations in 39 substantive chapters. Specifically, the following sectors (with their associated chapters) are addressed in Agenda 21.

A. Critical elements of sustainability (Chapters 2-5)
B. Financial resources and mechanisms (Chapter 33)
C. Education, science, transfer of environmentally sound technologies, cooperation and capacity building (Chapters 16, 34-37)
D. Decision making structures (Chapters 8, 38-40)
E. Roles of major groups (Chapters 23-32)
F. Health, human settlements and fresh water (Chapters 6,7,18, and 21)
G. Land, desertification, forests and biodiversity (Chapters 10-15)
H. Atmosphere, oceans and all kinds of seas (Chapters 9, 17)
I. Toxic chemicals and hazardous wastes (Chapters 19,20, and 22)

Agenda 21 is not intended to provide detailed policy direction to its signing nations, but to identify objectives and indicate types of action which should be taken for the world community to achieve sustainable development. The initial focus of Agenda 21 is on the 7 year period following UNCED from 1993 to the year 2000, and then beyond into the twenty-first century. Agenda 21 is a non-legally binding and non-prescriptive circumscription of the activities necessary for humans to achieve a long-term environmentally and economically sustainable contract with the planet.

At UNCED, the world community explicitly and formally recognized the fundamental interdependencies between environment and development - between human survival and ecological integrity. It may be hoped that this recognition constitutes a precursor to national and international actions and processes in the human economy which support, rather than undermine, these interdependencies. While various criticisms have been levelled at Agenda 21 from several quarters, there is little doubt that the implementation of Agenda 21 recommendations would go far toward providing this support.

Eradicating the causes of poverty and making wealth creation both more evenly distributed across the globe and more benign in its impact on the environment are seen in Agenda 21 as among the essential challenges to be met on the path to sustainable development. Inherent in Agenda 21, therefore, is the belief that for the majority of the Earth's rapidly expanding citizenry, there

remains the potential to live in harmony with the environmental attributes and capacities and to concurrently enjoy a healthy and materially satisfied standard of living. Agenda 21 may be considered only a first, albeit critical, step in fulfilling this potential.

Several fundamental assumptions or premises underlie Agenda 21 and they are identified in this report. These premises must be recognized if Agenda 21 is to be appreciated both for its weaknesses as well as for its strengths. The pre-eminent importance of economic growth, for example, in achieving global sustainable development pervades the document. Yet one may reasonably question whether the tenets of economic growth, as are currently accepted and promoted in Agenda 21, are in themselves environmentally unsustainable in the long-term. Other Agenda 21 premises are that:

- the promotion of sustainable development should be pursued at all levels;
- present social-political-economic norms and structures have the capacity to evolve into structures which are capable of promoting sustainable development and that the political will to move forward on Agenda 21 commitments will exist;
- Agenda 21 recommendations are adequate to assure the preservation of the global environment;
- international cooperation will be perceived as paramount and will be forthcoming in resolving environmental problems at global and regional levels; and
- the United Nations system will take the lead in moving the world toward sustainable development.

Hence, although the various premises inherent in Agenda 21 are not expressly articulated, they are nonetheless in need of acknowledgement and deserve scrutiny, as they ultimately seek to legitimize the magnitude and means of resource allocation called for in Agenda 21's many recommendations.

In reviewing the economic implications for Canada of Agenda 21 implementation, a number of cross-cutting themes become apparent and merit discussion. For instance, the importance of wealth transfer to developing countries, through direct financing as well as indirectly through trade liberalization and debt alleviation, is essential to enable these countries to implement their Agenda 21 commitments. However, it is equally important to bear in mind that close to 80% of the funding needed by developing countries (or some $475 billion U.S. per year) is expected to come from developing countries themselves. For this reason, the indirect financing methods, such as those referred to above, combined with sound economic policies in developing countries, are necessary to help provide these countries with the financial flexibility they need to implement Agenda 21.

Other economically relevant themes which are evident concern both the necessity of undertaking the **valuation** of environmental resources and the importance of **capacity building** in developing countries. The former reflects a growing awareness of the need to include in economic decision-making processes the "true" value of environmental inputs, such as air, water, and soil. The means through which these inputs can best be internalized into current economic decision-making models are far from clear. Nonetheless, experiments in the use of economic instruments, such as carbon taxes or tradeable pollution permits and full-cost resource pricing, suggest that environmental inputs can indeed be incorporated into these models. Finally, perhaps the most cross-cutting theme of all is the importance of promoting capacity building initiatives in developing countries in support of efforts directed at sustainable development. International cooperation in technology transfer and human resource development, for instance, are central to enabling developing countries to acquire the capacity to achieve and maintain sustainable development with minimal external assistance.

Discussion of Agenda 21's premises and themes provides background to this report's review of selected Agenda 21 chapters which follows. Nineteen chapters are chosen for review; these chapters will, upon implementation by Agenda 21 signing nations, have the most direct implications for the Canadian economy and that is why they were included this report.

As a document which is based upon consensus and compromise among nations, each with specific economic and environmental priorities, Agenda 21 is undeniably less than perfect in encouraging global sustainable development. Nonetheless, Agenda 21 serves as a sound and legitimate plan outlining what must be done over coming years if precepts supporting sustainable development are to be put into practice at the international, national and regional levels of society. In fact, it does not seem too dogmatic to assert that responsible stewardship of the Earth for future generations and, in all likelihood, human survival itself, will depend on a transition to the types of activities recommended in Agenda 21. In view of current global environmental trends, one cannot help but be left with the impression that this transition should be undertaken with considerable haste and that a sense of urgency should prevail.

INTRODUCTION

"What industrial man has been doing over the last three centuries is to break down the planet's defenses. We have disrupted the process that changed Earth from a lifeless planet to a life-sustaining one. At first we were unwitting agents of our own damnation. But we are no longer innocents. Against the charge of ecocide, the human species will soon have no defense." **(1)**

Background

On 22 December 1989, the United Nations General Assembly called for a global meeting to devise strategies to halt and reverse the effects of environmental degradation "in the context of increased national and international efforts to promote sustainable and environmentally sound development in all countries". The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro during June 1-12, 1992 was the international community's response to that request.

This largest inter-governmental conference ever held saw 105 Heads of State and Government formally agreeing to the principles and programs outlined in five key documents - Agenda 21, the Conventions on the Atmosphere and on Biodiversity, the Rio Declaration and the Statement of Principles on Forests. **(2)** These documents were negotiated during UNCED and the four Preparatory Committee conferences (PrepComs) leading up to UNCED. Negotiations took place formally and informally, in working groups, plenary sessions, in corridors and over cups of coffee. Over 90% of the Agenda 21 document was agreed to even before UNCED was convened.

The Agenda 21 document contains 39 chapters, with 115 program areas in almost 500 pages of text. It covers a wide range of environment and development issues - from atmosphere, soil, forests, and oceans to population, consumption, toxic and solid waste disposal, technology transfer and financing. The programme areas in each chapter are described in terms of basis for action (a definition of the problems), objectives, activities to be undertaken, and means of implementation, including funding requirements.

To understand Agenda 21 it is useful to know why and how it came about. UNCED was a successor to the Stockholm Conference on the Human Environment (1972), which first put environment on the international agenda. The idea of holding a conference on environment AND development arose from the 1986 World Commission on Environment and Development (WCED) or Brundtland Commission, named after Norway's Prime Minister, Gro Harlem Brundtland.

The Canadian delegation to the UNCED PrepComs and UNCED included

not only government experts, diplomats, and politicians, but also representatives from environment and development Non-Governmental Organizations (NGOs), women's organizations, youth and indigenous groups, business and industry. All contributed to the framing of Canada's positions on the many issues presented at UNCED.

Although not an official part of the Earth Summit Conference, a major parallel event, **the International Non-Governmental Organization Forum** (Global Forum) was also held in Rio. Over 3,180 NGOs registered and participated in this gathering to discuss, plan for and network on environment and development matters. Out of this Forum emerged a parallel set of documents - the NGOs' Earth Charter and Alternative Treaties. While these documents are not addressed in this report, they provide an interesting and alternative perspective on issues covered in Agenda 21.

The purpose of Agenda 21 is to forge a global partnership between developed and developing countries (DCs) in "sustainable development" - defined by WCED (The Brundtland Report) as "development that meets the needs of the present without compromising the ability of future generations to meet their needs."

There are four categories of chapters in Agenda 21. Category one consists of chapters outlining the steps necessary to address major development problems in a sustainable manner. These problems include poverty, consumption patterns, population and human settlements. Category two chapters address environmental issues such as protecting the atmosphere, combating deforestation and desertification, promoting sustainable agriculture and rural development, conservation of biological diversity, and environmentally sound management of solid wastes. Chapters in the third category outline how the role of women, youth, indigenous people, non-government organizations, and industry can be strengthened to enable these groups to pursue sustainable development activities. The fourth category chapters describe the methods of Agenda 21 implementation, including provision of financial resources and mechanisms of delivery, transfer of environmentally sound technology, promotion of education and public awareness and institution building.

Objective

The objective of this report is to review Agenda 21's implications for Canada, particularly from an economic perspective. Canada's competitive position, for instance, may be affected by a number of the actual and proposed international agreements emanating from UNCED. Agreements on global warming and forestry, when implemented, could have substantial positive and negative effects on Canadian industry. If Germany and Japan, for example, who are already more efficient users of energy than Canada, unilaterally induce their

industries to become even more efficient (with CO2 reduction targets or energy taxes, for example), then Canada could fall further behind in its ability to compete with these industries.

Structure

This report is made up of three Sections. The **first Section** consists of two Parts followed by two Appendices. Upon review of Agenda 21, it is clear that several key assumptions or premises exist which support the bases for action, objectives and related recommended activities found within. In Part I, these premises are described. It is important to be aware of these premises at the outset, since they constitute the foundation on which Agenda 21 rests.

It is also evident upon examination of Agenda 21, that several cross-cutting themes or common threads reappear in various chapters. Of the many themes which can be identified, only those which have clear and direct environmental and/or economic implications for Canada, fall within the purview of this report. These are examined in Section I - Part II. The themes described are:

- promotion of wealth transfer to DCs both directly and indirectly through such means as trade liberalization and DC debt relief;
- assigning values to environmental resources, such as air, water and soil; and
- application of science and technology in capacity building.

The matter of trade liberalization, for example, is being examined in a number of fora (e.g., The General Agreement on Trade and Tariffs (GATT), the Organization for Economic Cooperation and Development (OECD) and the North American Free Trade Agreement (NAFTA)) and may have major implications for national and international environmental policies. It is important, therefore, to understand these implications to enable the subsequent coverage of individual chapters in Section II to be more readily appreciated in the context of the entire Agenda 21 document.

A few questions of definition arise with regard to the subject of sustainable development. What, for example, is the accepted definition of "sustainable development"? What is economic "growth"? There has been some writing on these questions, and a synopsis of this thinking is helpful. Please refer to Appendices I and II at the end of Part I for this discussion.

Notes and references to Section I appear at the end of the Section.

The **second Section** of this report consists of an overview of those chapters of Agenda 21 that contain recommended activities which, if implemented, are most relevant to the Canadian economy. The choice

of these "core" chapters is necessarily somewhat subjective, as recommended activities found in virtually all Agenda 21 chapters can be said to have at least some direct or indirect effect upon Canada's economy - perhaps only because Canada will be expected to help provide necessary funding. (Reviews and synopses of all Agenda 21 chapters are available from other sources for interested readers).(3) In Section II, the essence of each core chapter is distilled into a few paragraphs including the main objectives and recommended activities. The description of each chapter is then followed by a discussion which includes:

-qualitative economic implications of the chapter's objectives and recommendations;
-criticisms which have arisen with regard to the chapter;
-where applicable, information with respect to why certain items of particular Canadian concern were included or excluded; and
-where applicable, the impacts on various Canadian industrial sectors which would result from implementation of recommendations.

Information for the discussion of relevant chapters is derived from both a literature review (e.g., background documentation, relevant papers, PrepCom material) and from conversations with Canadian participants at UNCED and with those involved in preparing Canada's contribution to Agenda 21.

In the **final Section** of the report, the role of various national and international organizations in UNCED follow-up activity is reviewed. The status of their relative activities and their plans for continuing work, where available, are also addressed.

NOTES

(1) Ramphal, Shridath. Our Country the Planet, Island Press, U.S.A., 1992, p.20.

(2) The complete name for the Forest Principles is: "Non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests".

(3) For a review and critique of all chapters of Agenda 21, the reader is directed toward the Agenda 21 Outline, February, 1993. A synopsis of all chapters is also available from the Canadian International Development Agency (CIDA) and from the "Earth Summit Press Summary of Agenda 21", (United Nations, June, 1992).

SECTION I

PREMISES and THEMES

In Part I to this Section the major premises of Agenda 21 are identified, including a summary of the definition and scope of sustainable development (Appendix I) and of the quandary inherent in the Report of the World Commission on Environment and Development (WCED) (Appendix II).

In Part II, the themes of Agenda 21 having economic implications for Canada are reviewed.

PART I - PREMISES

(PREMISE I)

The first premise on which Agenda 21 rests is that the promotion of **sustainable development** at regional, national and international levels should be engaged wherever possible.

(PREMISE II)

Central to the notion of sustainable development is the premise that **the main vehicle to ensure environmental preservation is economic growth.** This tenet was clearly articulated by the Brundtland Commission Report in 1987 and it has been similarly adopted in Agenda 21. Specifically, Agenda 21 is founded on the hypothesis that economic growth, with the resources and income redistribution processes it can engender, is necessary to bring about the fruits of sustainable development, such as poverty alleviation and environmental preservation. Consequently, such measures as trade liberalization, financial assistance, international cooperation, technology transfer, and increased competition within and among countries are viewed as integral to the promotion of sustainable development. As a result of this hypothesis, many of the objectives and recommended activities found in Agenda 21 centre on fostering economic growth.

(PREMISE III)

The third premise which underlies Agenda 21 is double-sided. First, it is assumed that **present social-political-economic norms and structures have the capacity to evolve into structures which are capable of promoting sustainable development.** Second, it is assumed that **there will be sufficient political will** on the part of nations to move forward on their Agenda 21 commitments. As such, notwithstanding that Agenda 21 is not legally binding and contains

no hard commitments to which governments must adhere, it is assumed that these structures shall so evolve, largely through multilateral efforts on the part of governments and international institutions.

It has been argued, particularly by environmentalists, that the long and cumbersome processes required to act multilaterally are inadequate in view of the urgency of various ecological problems. Others, however, counter that only through multilateral negotiations is it possible to balance all legitimate interests. The latter is both Canada's position and that of Agenda 21. Moreover, informal discussions at UNCED concerned whether governments actually have the capacity, organized as they are by departments with their own separate and competing agendas, to tackle the complex issues involved in integrating environment and development goals. Even more to the point, perhaps nation states, each seeking to protect their own self-interest, cannot be expected to adequately protect the common global interest. In effect, an increasingly interdependent world may no longer be able to afford the luxury of imaginary boundaries surrounding independent governments, particularly when it comes to negotiating international environmental agreements. To this end, forms of global or universal governing authorities are seen by some as a necessary and logical remedy to ensure that the environment is managed in a manner most conducive to enabling sustainable development to occur.

(PREMISE IV)

The fourth premise underlying Agenda 21 is that the recommendations it contains are **adequate to assure the preservation of the global environment.** It is assumed by its authors that the Agenda 21 blueprint for ecological survival is sufficiently comprehensive to resolve the world's environmental problems and, in addition, there remains adequate time to implement the recommended activities. It is noted, however, that there are those who firmly believe much more is required within the Agenda 21 framework if society is to avert an inexorable downward spiral of economic stagnation coupled with environmental decay. Indeed, as an example, the Worldwatch Institute, in its recent State of the World, 1993, argues that despite the enthusiasm generated by UNCED, "...the strides made in Rio were not nearly long or swift enough to save the earth."

(PREMISE V)

The fifth premise of Agenda 21 is that **international cooperation will be paramount** in resolving environmental problems at both global and regional levels. Each chapter of Agenda 21 has a section titled "capacity building". As such, it is recognized throughout the document that DCs will require considerable assistance in financing, designing and implementing strategies and technologies which promote sustainable development. It is clearly axiomatic that

for Agenda 21's recommended activities to be successfully implemented, they be undertaken in a spirit of international cooperation and support.

(PREMISE VI)

The final premise is that it will largely be **the United Nations system which will carry the torch for sustainable development** and, therefore, for coordinating Agenda 21 implementation. The effects of the United Nations having seized the mantle in this regard, remain to be seen. At a minimum, however, it is clear that Agenda 21 both confers greatly enhanced spending and administrative powers upon the United Nations system and places a commensurate onus upon national governments to preserve regional and global environments. The United Nations may, consequently, take on a far more salient and influential role in the human economy over coming years if Agenda 21 implementation proceeds as conceived. Not surprisingly, the proposed enlarged role for the United Nations and national governments has appeared as one of Canadian industry's concerns with Agenda 21. In addition, the United Nations has been criticized for not being sufficiently strategic in its thinking and orientation to take the lead on sustainable development.

APPENDIX 1 - What <u>is</u> Sustainable Development?

> *"The planet will transit to sustainability: the choice is between society planning for an orderly transition, or letting physical limits and environmental damage dictate the timing of the transition."(1)*

As Agenda 21 is a blueprint for global sustainable development, it is useful to have some appreciation of what "sustainable development" actually is. While the notion of pursuing development which is environmentally sustainable is not new, it has reemerged as a catch phrase of recent years as a result of the 1987 Brundtland Report. There has, nonetheless, been no clear consensus on a specific definition for sustainable development. Within the Brundtland Report, for example, is found more than one definition, but that which has since been most quoted is the following: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"(WCED, 1987). This definition is considered by most writers on the subject of sustainable development to be concerned not only with ecological preservation, but also with the safeguarding of social and cultural values and norms. The International Institute for Sustainable Development (IISD) has developed a definition which tries to articulate sustainable development "in terms familiar to business and government leaders". The definition offered was to assist business leaders in applying the concept to their enterprises:

> "For the business enterprise, sustainable development means adapting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future".

In the context of Agenda 21, this definition is perhaps the most germane, as Agenda 21 places a heavy reliance on business and industry in moving the world toward sustainable development. The business definition of sustainable development does not appear to be incompatible with that of Brundtland - it is simply more focused to business needs.

Sustainable development is generally considered to require an element of economic **growth**. Does this "growth" necessarily demand ever increasing physical inputs from a finite world or can technological innovation be assumed to be capable of providing infinite resource possibilities? In addition, the question has been asked, but so far remains unanswerable: what if sustainable development is an oxymoron? That is, what if encouraging economic development, regardless of how it is practised, proves to be an environmentally unsustainable phenomenon? Agenda 21 and proponents of sustainable development have assumed that economic development,

as measured by increasing GNP, **can be** environmentally sustainable.

A number of definitional distinctions need to be kept in mind. David Pearce etal.(2) have suggested an outline of these distinctions and they are repeated as follows:

Economic Development means real GNP per capita is increasing over time. But observation of such a trend does **not** mean that growth is "sustainable".

Sustainable Economic Growth means that real GNP per capita is increasing over time **and** the increase is not threatened by "feedback" from either biophysical impacts (pollution, resource problems) or from social impacts (social disruption).

Sustainable Development means that per capita utility or wellbeing is increasing over time.

As mentioned, the question arises as to whether economic growth **necessarily** requires ever increasing additions of physical inputs. If the answer is no, then one would think the achievement and maintenance of sustainable development and a decent standard of living for everyone is all the more achievable. Some writers have noted that there is a distinction between "throughput growth" with its reliance on an ever-increasing throughput of energy and other natural materials, and growth in human-made capital.(2) The latter involves, for example, the further application of knowledge intensive inputs into the economy backed by continuing increases in efficiency and environmentally sound technologies. Inputs of this nature are far more environmentally benign than the inputs which have traditionally been used to achieve economic expansion. Few, however, would contend that human-made capital could ever completely substitute for throughput inputs. Afterall, if the population grows so too do the requirements for physical necessities (let alone the non-necessities of life) which in turn require increases in physical inputs.

If there were any doubt about the reliance placed upon economic growth by the United Nations to cure the planet's many woes, they are effectively dispelled in the following excerpt from the United Nations 1992 Report on the State of the World Economy:

> "Without a more dynamic world economy, the current liberalization efforts of developing countries will not bear fruit. Outward oriented development strategies largely rely on buoyant international trade and, hence, an expanding world economy to achieve their objectives. There is today much concern about the lack of resources for such urgent needs as the reconstruction of the east, a concerted attack on poverty and human development in the poorest countries, and environmental investments of all kinds. If the growth of world output returns to the

levels of the 1980s, total output would grow by about one trillion dollars a year. There is in fact, no other way to resolve the economic and political crises multiplying in the world community than to give priority to the restoration of growth...Restoring a more vigorous and dynamic climate of growth in the world economy must be the principal objective of international economic cooperation in the years ahead"

APPENDIX 2 - The Quandary of Brundtland

> *"Present-day society is locked into four positive feedback loops which need to be broken: economic growth which feeds on itself, population growth which feeds on itself, technological change which feeds on itself, and a pattern of income inequality which seems to be self-sustaining and which tends to spur growth in the other three areas. Ecological humanism must create an economy in which economic and population growth is halted, technology is controlled, and gross inequalities of income are done away with."* **(3)**

Because much of what appears in Agenda 21 is based on the conclusions of the 1987 Brundtland Report, it is important to note that there remain serious questions regarding the soundness of these conclusions. While the details of the Brundtland Report will not be reproduced here, a potentially serious quandary with the Brundtland Report is evident and is worth outlining. As noted in Appendix I, central to the alleviation of poverty in DCs is Brundtland's assertion that economic growth must be encouraged to flourish. Brundtland sees a requirement for a **five- to ten** fold increase in manufacturing output "just to raise developing-world consumption of manufactured goods to industrialized world levels by the time population growth rates level off next century." Economic wealth would then be available both to repair the environment and for income redistribution, (**Premise II**) both intra-nationally, and from the richer to the poorer nations. It has been suggested, however, that the Brundtland strategy is highly questionable, mainly on the grounds that the scale of economic growth it (and Agenda 21) envisages and encourages would, by itself, be environmentally devastating. One author on the subject, for example, offers the following alternative remedy:

> If we are serious about saving our planet, we must seek a steady state for the economies of the rich, while the poor grow and develop so that poverty is eradicated and income disparity, which is the source of so much environmental damage, reduced. Meanwhile technology development and dissemination should be accelerated and population growth urgently halted. **(4)**

In view of this prescription, one has to wonder if the sociological implications and political economy of maintaining a steady level of income in the developed countries is at all realistic. Yet continuing economic growth, particularly of the magnitude envisaged and advocated by Brundtland and supported by Agenda 21 may just not be environmentally tenable. There may, therefore, be a quandary in accepting Brundtland's remedy of encouraging economic growth to promote global sustainable development.

The impact of developed country economic expansion or contraction on DCs has often been seen as environmentally benign. However, that there exist firm environmental linkages between developed countries and DCs as a result of economic policies and events in the former is quite clear. When growth slows in developed countries, the DCs tend to suffer from depressed incomes and adverse terms of trade. Consequently, there can be further pressures on already stressed environments as DCs seek to expand economic production to make up shortfalls. It appears, therefore, that economic growth in the developed nations, which use the bulk of the world's resources to support a minority of the global population, is fundamentally necessary to fuel economic growth and poverty alleviation in the DCs. Yet, as has been described, such growth, (which continues to be essentially exponential despite recessionary deviations such as that experienced over the past few years), may just not be capable of long remaining within global environmental carrying capacities in either developed or developing countries. What Brundtland and Agenda 21 are advocating therefore, may be a cure worse than the disease. Alternatively, critics of the Brundtland and Agenda 21 strategy suggest that for humankind to make a lasting peace with the environment, fundamental changes to consumption norms and material expectations along with a complete revamping of existing accounting and economic models is in order. This revamping would likely leave little room for the concept of economic growth as it is presently understood. Discussion of just what these changes might entail appears in Part II.

PART II - THEMES

The following themes having direct economic implications for Canada are evident in Agenda 21:

1) Wealth Transfer - Direct Financing to Developing Countries
2) Wealth Transfer - Indirect Financing to Developing Countries
   (i) Trade Liberalization
   (ii) Developing Country Debt Relief
3) Environment as a Valuable Resource
4) Application of Science and Technology in Capacity Building

Each of these themes is discussed through the remainder of this Section. The purpose of this review is to discern the relevant economic and environmental ramifications for Canada inherent in each of these themes with respect to Agenda 21 implementation.

(THEME 1) WEALTH TRANSFER - Direct Financing to Developing Countries

Introduction

This theme centres on the notion that major direct infusions of wealth from developed to developing nations must occur in the decades ahead for global sustainable development to become a reality. Of the annual $600 billion U.S. called for in Agenda 21, some $125 billion U.S. of this amount is expected to be provided by developed countries in the form of Official Development Assistance (ODA). Presently, about $55 billion is being so provided. There existed a consensus among signatories to Agenda 21 that, although DCs must provide close to 80% of the financing to implement their Agenda 21 commitments, there will also be a requirement for increasing levels of capital and investment from developed countries. This capital and investment, in combination with sound DC domestic economic policies, are requisite to raising material standards of living up to and beyond the thresholds required to enable DCs to effectively deal with their environmental problems. It has, however, been evident that even the hardest-line G-77 members do not expect the realization of commitments at UNCED to an immediate $70 billion increase in annual ODA. Indeed, the DCs accepted the unreality of such numbers at a time of global recession when special demands were being made on developed countries to assist the republics of the former Soviet Union and the countries of East Central Europe.

The wealth transfer theme appears in 14 of the Agenda 21 chapters, in addition to Chapter 33 (**Financial Resources and Mechanisms**) which deals exclusively with financing the implementation of Agenda 21. The role of adequate international funding in promoting global sustainable development is explicit in Chapter 33, as follows:

> "Economic growth, social development and poverty eradication are the first and overriding priorities in developing countries and are themselves essential to meeting national and global sustainability objectives. In the light of the global benefits to be realized by the implementation of Agenda 21 as a whole, the provision to developing countries of effective means, inter alia, financial resources and technology, without which it will be difficult for them to fully implement their commitments, will serve the common interests of developed and developing countries and of humankind in general, including future generations" (Chpt.33.3)

(Chapter 33 is reviewed in Section II of this report).

The Need for Wealth Transfer

Various groups, including a number of NGOs, have concluded that DCs were underrepresented at UNCED and, hence, had disproportionately less influence in the formation of Agenda 21 than did developed countries. While this conclusion may be debatable, it is apparent that DCs have a bargaining chip to help encourage the provision of capital and investment from the developed world. In short, none of the subjects in Agenda 21 can be successfully addressed without DC cooperation. A clear example of this symbiosis is provided by Chinese plans to double GNP within the next 15 years. If this increase takes place with present Chinese energy technology, the effects on global CO2 emissions would be significant in the extreme. Studies have shown, however, that this increase in GNP could be achieved with no increase in energy use (and therefore CO2 emissions) if some of China's 750,000 inefficient industrial boilers were replaced with more modern vessels.(5) The costs would be large, but the technology is available. The Chinese, however, have few incentives to bear these costs on their own. Indeed, they feel that developed countries should bear the majority of these costs. Words from the 1991 Beijing Ministerial Conference of Developing Countries squarely state the DC position on the provision of assistance by developed countries to DCs:

> "While the protection of the environment is in the common interest of the international community, the developed countries bear the main responsibility for the degradation of the global environment. Ever since the Industrial Revolution, the developed countries have over-exploited the world's natural resources through unsustainable patterns of production and consumption, causing damage to the global environment, to the detriment of developing countries. The developed countries, in view of their main responsibility for environmental degradation and their greater financial and technological capabilities, must take the lead in

eliminating the damage to the environment as well as in assisting the developing countries to deal with the problems facing them." (6)

Issues regarding how financing to DCs will be delivered to help enable Agenda 21 implementation proved to be among the most contentious of those discussed prior to and at UNCED. From Canada's perspective, seven principal funding pressures in meeting UNCED objectives have been identified: (7)

1)debt relief
2)Global Environment Facility (GEF) funding contribution
3)Montreal Protocol replenishment
4)International Development Agency (IDA) replenishment and Earth Increment contribution
5)Multilateral development banks
6)re-affirmation of Official Development Assistance (ODA) target of 0.7%
7)unforeseen pressures

All of these funding mechanisms, except for debt relief (and possibly number 7 - unforeseen pressures), constitute direct monetary inputs to DCs. As these inputs emanate from Canadian obligations articulated on the international stage at UNCED, it is important to be aware of the size of this financial commitment.

Canada's Financial Commitments

The following are Canada's commitments (in Canadian $) to the funding requirements laid out in Chapter 33 (**Financial Resources and Mechanisms**).

(a) $25 million to the Global Environmental Facility ($10 million from the Green Plan and $15 million from ODA)

(b) $10 million to assist in establishing model forests in three DCs in order to demonstrate sustainable forest management practices (from the Green Plan)

(c) $16.7 million to the Rain Forest Pilot project initiated by the G7 countries and Brazil. (The project is designed to promote conservation of the Brazilian Amazon rain forest)

(d) $2 million to the United Nations Development Programme (UNDP) toward a 3 year pilot project to assist in preparation of national sustainable development plans - (similar to the Canadian Green Plan)

(e) $11 million to the United Nations Environment Programme (UNEP) over 5 years

(f) 0.7% of GNP directed at ODA "as soon as possible"

(g) IDA replenished at IDA-9 levels with no Earth Increment, as had originally been proposed

For perspective, Canada currently spends about 0.4% of GNP on ODA which, in absolute terms, will amount to about $2.9 billion in 1992/93. To increase this amount to 0.7% of GNP would equal an amount of some $5.2 billion - an increase of $2.3 billion. Clearly, Canada's other Agenda 21 financial commitments pale in comparison to the increase in ODA which has been accepted as necessary. Needless to say, the lack of a target date for this increase is a sore point for critics who maintain that there is in Agenda 21 simply no incentive for government to ever meet the target. However, it seems safe to say that if Agenda 21 recommendations are to be taken seriously, meeting the 0.7% target by all developed nations will be necessary.

UNCED Financial Follow-up Considerations

The financial follow-up to UNCED will involve a careful look at the Global Environmental Facility, the three-year pilot program of $1.3 billion U.S. established in November 1990 and operated by the World Bank, UNEP, and UNDP. The World Bank serves as administrator and repository of the facility and is responsible for major investments, while UNEP provides the scientific expertise and UNDP handles technical assistance for investment studies and small grants to grassroots organizations. The basic mission of the GEF is to cover the agreed incremental costs that DCs incur in order to achieve agreed global benefits, including their obligations under certain global environmental conventions. It presently funds projects in four areas of global environmental concern - climate change, biodiversity conservation, international waters and protection of the ozone layer. It should be noted that a number of changes which would enlarge the number of subjects eligible for GEF funding are presently under consideration and a number of issues remain to be resolved. These include governance, the GEF replenishment,and the relationship of the GEF to the global environment conventions agreed at UNCED. Longer term issues of how to source the Canadian contribution also remain. It can be concluded that completion of the GEF restructuring exercise in a way that satisfies developed and developing countries is essential, particularly if donors are to increase their contributions beyond the pilot stage.

In addition to the magnitude of the financial commitment, the means by which foreign assistance is applied to DC sustainable development is also critical. Very little of the aid money which has historically been disbursed to DCs by governments and international lending institutions has supported ecologically sound development.(8) At UNCED there was debate on increasing overseas

development aid, but not on the criteria which should be met in giving it, or on the delivery channels through which aid could more effectively reach the intended recipients. For example, The World Bank, the world's largest single aid funder, has been accused by environmentalists of lacking a coherent vision of a sustainable economy, and that its lending priorities consequently often run counter to the goal of creating one. The role of this aid agency in furthering sustainable development initiatives may, therefore, be contentious.

The Agenda 21 chapters which deal with institutional change (Chapters 37-39) speak of the need to ensure that national and international institutions realign their priorities in favour of the environment in the making of strategic and operational decisions. It seems, however, that this realignment could be incomplete without first amending the modus operandi of these institutions to ensure the aforementioned criticisms are addressed. In addition, without domestic economic policies which enable donated and invested funds to be applied to goods and services supportive of sustainable development, the funds will do little to support the spirit and intent of Agenda 21 let alone its specific recommendations. The benefits of wealth transfer from developed to developing nations, therefore, will not be realized until internal obstacles which impede sustainable development are unblocked. The UNDP Human Development Report, for instance, has estimated that DC's could release as much as $50 billion U.S. a year for meeting their sustainable development objectives if they lowered their military expenditures, privatized public enterprises, corrected distorted development priorities, and rooted out corruption. (9)

(THEME 2) WEALTH TRANSFER - Indirect Financing to Developing Countries

Below are discussed the two main methods through which Agenda 21 encourages an indirect redistribution of the planet's wealth from rich nations to poor - DC debt relief and trade liberalization. Both methods are of relevance to EAITC interests as each has a bearing on the multilateral and bilateral trade to which Canada is and will be party over coming years.

THEME 2(i) DEVELOPING COUNTRY DEBT RELIEF

Introduction

While the world debt crisis of the 1980s has abated and is no longer considered a threat to the international banking system, it may remain a serious impediment to the ability of many DCs to finance Agenda 21 implementation. By the beginning of 1991, the DC's stock of debt stock stood at $1.3 trillion U.S.(10) Servicing this debt resulted in a transfer of $168 billion U.S. to the developed world in 1992, of which interest payments alone amounted to $76 billion U.S.; debt service costs exceed net development assistance by a factor of four. The continuing high level of DC debt, particularly in Africa, Central America and the Caribbean, is acknowledged as a problem in need of resolution in five Agenda 21 chapters.(11) Chapter 33, for instance, states:

> "It is important to achieve durable solutions to the debt problems of low and middle income countries in order to provide them with the needed means for sustainable development. Measures to address the continuing debt problems of low and middle income countries should be kept under review. All creditors in the Paris Club should promptly implement the agreement of December 1991 to provide debt relief for the poorest heavily indebted countries pursuing structural adjustment; debt relief measures should be kept under review so as to address the continuing difficulties of those countries".

From the Canadian point of view, discussion of debt and development is important for three reasons. First, some perspective on the size of the regional and global DC debt loads, the types of debt extant, and the amounts which are owed to Canada are necessary to give context to both the severity of the DC debt situation and Canada's role as a creditor nation.

Second, if Agenda 21 implementation is to proceed, the world simply cannot afford another debt crisis similar to that experienced over the past decade. To this end, in the following discussion one of the areas which is addressed is whether there are any policy

changes to the international banking and finance system, which have either been taken or which are proposed, that would preclude or lessen the chances of another debt crisis occurring. It is, for example, emphasized in Agenda 21 - Chapter 2 (2.27, 2.28) that "a strengthened debt strategy" is necessary to deal both with continuing DC debt burdens and to ensure the avoidance of further debt crises. Whether anything is being done or is proposed in this regard by Canada or other developed countries should be known.

Third, industrialized economies also suffer as a direct consequence of debt problems, since exports to indebted developing countries may be severely reduced. For example, in 1980, almost 23% of Canada's total exports were to countries outside the OECD group. By 1985, this proportion had fallen to just over 11% - a fraction that has since increased only slightly.

In applying debt alleviation initiatives to indebted trading partners, a tradeoff is apparent in balancing exports gained against loss of payments received from loans outstanding. While assessing such tradeoffs involves more than weighing purely short-term pecuniary considerations - such as humanitarian concerns and long-term DC economic growth potential resulting from debt forgiveness - pecuniary considerations nonetheless remain preeminent. However, in keeping with the spirit of Agenda 21, non-pecuniary considerations should be allocated high priority in both extending and, when necessary, forgiving credit. Unfortunately these considerations come at a price. For Canada to forgive the official debt of all the DCs with potential debt-servicing problems would, for example, cost Canadian taxpayers over $5 billion CDN. **(12)**

Background to Debt Crisis

To put the various causes of the debt crisis in context, a brief overview of relevant background is useful. In setting off a debt crisis, both macro- and micro-economic policies in debtor and creditor countries alike are important factors. For example, inflationary fiscal policies (such as large and chronic deficits), pervasive throughout Latin America in the 1980s, contributed to the accumulation of debt. So do over-valued exchange rates (particularly common in Africa), which frequently result from high inflation which, in turn, leads to balance-of-payment deficits as exports are discouraged and imports rise. (This predicament is not unknown to Canada.) Micro-level policies can have a similar impact. A policy typical in Africa, for example, is to keep food prices artificially low. Often such prices are sustained by the availability of food aid or cheap food imports from developed countries. Unfortunately, in addition to adding to the import bill, such policies depress domestic food production, as farmers are not willing to produce for the local or export markets. As discussed in the **Environment as a Valuable Resource** and **Trade Liberalization**

themes, market distortions, such as subsidies, can prove to be a severe hindrance not only to the internalization of environmental inputs and costs, but to effective market-based allocation of goods and services. The consequent effects on economic growth potential cannot, therefore, be divorced from debt considerations.

The developed countries helped to precipitate the debt crisis through their fiscal, monetary and other policies. After the high commodity prices and low interest rates of the 1970s, which encouraged borrowing by DCs (much of it contracted at variable interest rates), a restrictive monetary policy was introduced in the early 1980s by the United States (followed by Canada and other developed countries) in an effort to curtail inflationary pressures built up during the 1970s. These policies slowed economic growth in developed countries, which in turn reduced opportunities for debtor countries' exports, and sharply raised interest rates, adding further to the DC debt burden. In short, these events had the effect of precipitating recession and promoting recovery in the developed world. Much of this recovery, it should be noted, was fuelled by massive debt financed military expenditures on the part of the U.S. (Please see Section II - discussion of Chapter 33 - **Financial Resources and Mechanisms**).

Upper middle-income countries, such as Mexico and Brazil, whose debt is owed largely to commercial banks, are generally eligible for debt reduction under the "Brady Plan". This plan provides official resources from the IMF and the World Bank which the debtor uses as partial security for the remaining bank claims. Each agreement so far has had distinctive features designed to meet debtor countries' objectives and to accommodate the diverse interests of the commercial banks. As of mid-1992, five countries (Costa Rica, Mexico, the Philippines, Venezuela and Uruguay) have concluded debt reduction agreements under the Brady Plan. Of relevance to the Agenda 21 wealth transfer objective, is that applications of the Brady plan have thus far been very limited in the amount of new money (which amounts to a de facto capitalization of a portion of interest falling due) which banks have been willing to extend. With few exceptions, the commercial banks have indicated they wish to withdraw from lending for general balance of payments needs and return to traditional trade credit and project finance activity.**(13)** The relatively small number of Brady countries to date may suggest that the plan has had only limited use. However, the plan was conceived to assist those middle-income debtors with substantial debts to commercial banks and which face a debt overhang problem severe enough to jeopardize efforts directed at long-term adjustment. Thus, while the number of Brady Plan beneficiaries is not likely to exceed ten countries, the magnitude of the aggregate debt relief is expected to be sizable, especially after Brazil and Argentina have concluded their Brady deals.

Lower middle-income countries are a heterogeneous group in which the mix of claims held by multilateral, official bilateral, and

commercial bank creditors varies from country to country. In 1990, the Paris Club, a group of Western financial and foreign affairs officials who meet to negotiate terms for rescheduling payments on loans issued or guaranteed by creditor governments of debts, took measures to provide relief from the debt burden to the poorest, most indebted countries, by providing longer repayment periods. As of the beginning of 1992, ten countries had benefited from these terms. Moreover, lower-middle income countries with large bilateral debts may also take advantage of a clause in Paris Club deals that allows up to 10% of bilateral official debt to be reduced if used for debt-equity, debt-for-nature, or debt-for-development swaps.

Low-income countries, essentially sub-Saharan African countries, are indebted largely to official bilateral creditors. Initiatives for the group of severely-indebted low-income countries, which have been based on humanitarian and development grounds, have evolved in the last four years in response to the need to alleviate further these countries' debt servicing burdens. This group of countries is now eligible for a concessional type of debt rescheduling known as "Trinidad terms" (further enhanced under the "Toronto terms") with the possibility of a reduction in their stock of debt in two years time. As well, the IMF and the World Bank provide concessional, longer term financing in support of adjustment programs from special donor-supported funding such as the Enhanced Structural Adjustment Facility (ESAF) and International Development Agency (IDA).

There are three categories of DC debt. The first is debt owed to **commercial banks** in developed countries. For perspective, of the total $1.3 trillion U.S. DC debt owed in 1992, some $562 billion U.S. was owed to commercial banks of which the Canadian portion was some $8 billion CDN (vs. $24.5 billion CDN in 1986). According to the International Monetary Fund, DC loans represent only 3.7% of the banks' total assets. The second category consists of **official creditors**, such as the World Bank, loans from governments and various intergovernmental and multilateral agencies. To these creditors, $606 billion U.S. was owed in 1992. The third category of debt is that owed to **other private creditors**, including manufacturers, exporters and bank credits covered by a guarantee of an export credit agency. To these creditors, $260 billion U.S. was owed in 1992.

In 1982, Canadian banks' aggregate DC debt exposure was $19 billion CDN accounting for 13 per cent of their assets. Exposure peaked at $25 CDN billion in 1986, and declined significantly thereafter to below $12 CDN billion by the end of 1991.**(14)** The bulk of Canadian bank exposure was and continues to be concentrated in a relatively small group of middle-income developing countries, in particular Mexico, Brazil, Venezuela, Argentina and Chile.

Implications of DC Debt Upon Agenda 21 Implementation

There is little argument that the debt crisis has matured into a development problem. Whether this problem is significant in terms of Agenda 21 implementation and in attaining sustainable development may be debatable. The ensuing discussion addresses this problem.

In combination with other factors which may apply, such as inefficient economic policies, corruption and large expenditures on military goods, heavy indebtedness can inhibit a country from directing financial resources to promoting domestic development initiatives. Indebtedness, therefore, may be a financial drain which cannot help but threaten to undermine debtor nations' Agenda 21 commitments. There exists, however, a consensus among many UNCED observers that Agenda 21 does not contain an effective response to alleviating DC indebtedness or to amending characteristics of the global economy which made it possible in the first place. The non-specific and largely prescriptive nature of Agenda 21 in regard to debt may, consequently, understate the serious implications of DC debt for promotion of sustainable development. Three such implications are identified and discussed as follows:

1) Without lifting the debt burden facing many DCs, scarce financial resources which would otherwise be available for promoting sustainable development are funnelled to where, in the context of global sustainable development, they are least needed - developed countries. Although the trend has recently reversed, during the 1980s a negative net wealth transfer to DCs was experienced. That is, more principal and interest were going out from these countries to creditor nations and their banks than was coming in as private foreign direct investments, private commercial loans and official development assistance.

Further aggravating the problem was the magnitude of capital flight from countries such as Mexico, Argentina and Venezuela during the 1980s - debt servicing would doubtless have been much easier in these countries if such capital flight had not occurred. The conventional explanation for DC capital flight is that private domestic investors lost confidence in their economies and sought a safer haven elsewhere. However, the high interest rate regime ushered in by the OECD countries in the early 1980s provided a powerful incentive to footloose short-term capital everywhere, including DCs. As a result, capital which could have been used for productive in-country capital investment, was exported in favour of monetary and financial instruments.

The recent removal of withholding taxes by developed country governments on interest payments to foreigners also increased the relative attraction for DC investors to put their money in developed countries. The monetary and fiscal policies of developed countries, in other words, have a profound effect on the

international flow of capital, particularly to and from DCs. If DC wealth loss of this nature, which clearly undermines Agenda 21's sustainable development objectives, is to be avoided, such policies as the withholding tax removal may need reconsideration.

2) To service their debts, many countries have sought to expand exports of various commodities and products. It has been suggested the economic pressure to meet debt commitments has been a contributing factor to the unsustainable use of natural resources (e.g., cutting rainforests for grazing cattle, or making furniture) and to the exploitation of labour resources (e.g., child labour). This contention is difficult to measure, although it is one which should be recognized by policy makers as a possible undermining factor to Agenda 21 implementation. This concern is explicitly expressed in Agenda 21 - Chapter 2: "It is important to ensure that structural adjustment programmes do not have negative impacts on the environment and social development so that such programmes can be more in line with the objectives of sustainable development". (Sect. 2.3)

A further consequence of the debt crisis has been that indebted DCs have had to reduce imports needed to promote growth, and by extension, sustainable development. This "import strangulation" has led to: reduced production because of DC reliance on imports for equipment, industrial inputs, fertilizers and the like; reduced investment because of the weakening of the economy; and reduced consumption because of falling real wages and employment opportunities. In turn, export earnings of developed countries are reduced, and similarly the tax base of government and consequent ability to promote wealth transfer to DCs. It has, for example, been estimated that, during the 1980s, at least $40 billion CDN in Canadian exports and 175,000 jobs for Canadians were lost directly as a consequence of DC debt.(15) It goes without saying that such a vicious cycle constitutes a severe hindrance to both global sustainable development aspirations, and Canadian export potential.

3) When the magnitude of the debt crisis became fully apparent by the mid 1980s, commercial banks began setting aside provisions on their balance sheets to cover possible loan losses resulting from a default. These provisions, which are tax deductible up to the 45% level, now typically cover about 70% of DC debt held by Canadian banks. While Canadian banks incurred heavy losses in the process, they had prepared themselves for any eventuality, and were considerably well insulated compared to banks in other countries.

The implications for the taxpayer, however, have also been significant. It was estimated that by late 1989 loan loss provisions on the part of Canadian banks had resulted in reduced tax revenues for the Canadian treasury in the order of $3 billion (i.e., nearly 10% of the federal deficit).(16) Note that such provisions do not reduce what is owed to the bank by the debtor nation. Banks, therefore, are protected through the tax benefit,

but the debtor countries remain liable in full for any due payments. As such, the developed countries' governments have less tax revenue available to assist DCs to promote sustainable development and, consequently, the wealth transfer objectives of Agenda 21 are further frustrated - wealth is in fact only transferred to the banks.

The effect such tax provisions have on commercial lending policies to DCs is not known. It is, however, reasonable to suggest that present tax provisions encourage banks to extend loans to those DCs which would, in their absence, be deemed too risky. The implication for Agenda 21 implementation seems to be that if another DC debt crisis is to be avoided, one measure would be to propose that no further tax credits for loan provisions be given to Canadian banks unless they result visibly in some debt reduction for debtor countries.

In addition to making use of loan loss provisions, by 1986 a secondary market for DC debt had developed in which banks could trade or sell their claims on DC's at a discount. This allowed banks to diversify or alternatively concentrate their loan portfolios among countries of their choice thereby reducing their exposure. For example, between 1987 and 1988, the Toronto-Dominion Bank sold over $1.5 billion CDN of its claims on DCs at an average price of about 50 cents on the dollar.(17)

Interestingly, the hardest debt of all to relieve has proven to be that of the multilateral institutions -- the IMF, the World Bank, and the regional development banks. While encouraging other creditors to suffer losses through partial debt forgiveness, these organizations have resisted reducing their own claims on debtor countries. Their grounds for opposition are that as the lenders of last resort, they must maintain lending standards or themselves face financial straits.(18)

Ironically, while the developing world is seeking to extract itself from its debt burden, one of the dominant features of Agenda 21 is the expressed need to encourage massive increases in global investment. This need includes the economic transformation of eastern Europe and the 15 countries of the former USSR, the structural adjustment programmes of many DCs for cleaning the environment and introducing less-polluting production processes worldwide. These investment needs demand the mobilisation of additional financial resources and a substantial increase in national savings rates to make available the necessary investment capital. The present limited financial flexibility of heavily indebted developed countries, including Canada, to fill these investment needs is a well known phenomenon and need not be elaborated upon in this report. Varying degrees of debt forgiveness, however, may be a means to help give DCs the financial flexibility to implement their Agenda 21 commitments. Moreover, despite the risks of perpetuating dependencies on foreign

assistance, extending further credit to DCs is also seen as an important means to help make these countries financially solvent in the long-term.

Summary

The debt problems which continue to face many DCs contribute to an undermining of the ability of these countries to get on the road to sustainable development. Moreover, international debt also has ramifications for developed countries in terms of their ability to make funds available to assist DCs to implement Agenda 21 obligations.

There have been no systemic or institutional changes to global economic and banking infrastructures which would obviate the possibility of another DC debt crisis occurring. Nonetheless, commercial banks have stated that they will never again make the mistake of believing that sovereign debt (i.e., debt extended to governments) carries no risk. In particular, it seems the banks have learned to avoid lending to countries to enable the financing of balance of payment deficits. Instead, there will be a return to the more traditional financing of trade opportunities and specific investment projects.

In an international context, there have been no concrete multilateral economic or institutional adjustments designed to dampen the volatility of fiscal and monetary policies which can precipitate a debt crisis. Indeed, given the cyclical nature of interest rates, events may well conspire to again set up DCs for onerous debt burdens. Lessons from the past appear to be abundant, yet without the will to establish safeguards against loan overextensions or to dampen interest rate fluctuations, applying these lessons would seem to be easier said than done.

Given the rising flows of wealth from developed to developing nations which must occur if Agenda 21 implementation is to proceed, new financing mechanisms and increasing use of those already in place will be required in coming years. As such, financial institutions, both commercial and multilateral, may become more and more involved in fuelling the economic growth which underlies the fulfilment of Agenda 21 objectives.

In the final analysis, the indebtedness of DCs - heavy though it was and still is in many countries - cannot be said to be the root cause of social and economic difficulties of those countries. By extension, the capacity to implement Agenda 21 does not seem to rest solely on erasing current debt and removing the threat of further debt. Hence, while external finance and debt alleviation measures can play an important catalytic role in promoting DC economic development, they may best do so if they act as a supplement to sound domestic economic policies backed by stable political, monetary and fiscal regimes. Unfortunately, in many

countries, this stability is not evident and does not appear to be forthcoming. One of Canada's objectives, as a major player in the Paris Club, IMF and World Bank, has been to press for not only additional debt relief, but strong IMF conditionality as well. As such, Canada argues for debt relief which is provided subject to economic reform by the debtor. Without this condition, measures to alleviate debt may amount to throwing good money after bad, hence frustrating Agenda 21 implementation.

THEME 2(ii) TRADE LIBERALIZATION

Introduction

The purpose of the following discussion is two-fold:

a) establish the importance of trade liberalization to Agenda 21 sustainable development objectives; and

b) identify international trade parameters affecting global trade liberalization.

The value of trade liberalization in achieving Agenda 21 objectives is noted in chapters on international cooperation to accelerate sustainable development (Chapter 2), forestry (Chapter 11), biological diversity (Chapter 15), biotechnology (Chapter 16), environmentally sound management of wastes and toxic chemicals (Chapter 19) and protection of the oceans (Chapter 17). In addition, trade provisions are included in the Conventions on Climate Change and Biological Diversity. However, with the exception of Chapter 2, the significance of trade to sustainable development tends to be conveyed in a low key fashion.

In Agenda 21, trade liberalization is considered the preeminent means for establishing long term economic growth in DCs. It was, however, acknowledged in PrepCom IV that issues relating to trade are already being handled in other multilateral fora (GATT, OECD). Hence it was implicitly decided that, while UNCED should give consideration to the importance of trade and highlight its importance for sustainable development, it should not devote too much attention to a matter which is being dealt with elsewhere. This lack of attention has been criticized on the grounds that environmental concerns in trade liberalization initiatives are given insufficient attention. For example, specific direction as to how international institutions, multilateral arrangements, or changes in domestic policies can best lead to environmentally and economically sustainable trade enhancement are notably lacking in Agenda 21.

Trade Discrimination and Environmental Standards

Before multilateral trade fora, such as the General Agreement on Tariffs and Trade (GATT), can fully proceed with less restrictive international trade measures, a number of issues require resolution. In the context of this report, the most important of these issues concerns the use of discriminatory trade measures appearing under the guise of environmental protectionism. This contentious issue is presently under review by the GATT. Until this review is complete and policies established to the satisfaction of GATT contracting parties, pursuit of Agenda 21 trade liberalization

objectives may be severely hindered.

Among the GATT's mandates (through the Working Group on Environment Measures and International Trade) is to determine what aspects of trade and environment can be addressed within existing GATT provisions. The object of this mandate is to ensure that the GATT rules deal fully with the legitimate use of trade measures taken for environmental protection reasons. There can, for example, be occasions in which an importing country will impose import restrictions on the grounds that the product in question was produced in a manner which does not meet the importing country's domestic environmental standards. Environmental standards, therefore, may be used as disguised barriers to trade.

Article XX of the GATT does in fact allow restrictions on imports for a variety of environmental or health reasons. Article XX provides that nothing in the GATT should prevent member countries from adopting measures to protect human, plant and animal life or to conserve exhaustible natural resources. Differences have arisen on the interpretation of these exceptions and the GATT dispute settlement panels have so far examined a number of such disputes. Applying import restrictions due to the environmental impacts of production processes in the exporting jurisdiction has proven to be highly controversial. The GATT rules, however, do constrain attempts by one or a small number of countries to influence environmental policies in other countries not by persuasion and negotiation, but by unilateral reductions in access to their markets.

The conflict between free trade and environmental priorities has been encapsulated in the recent conflict over US attempts to ban trade in canned tuna because dolphins were dying in the tuna nets. Dolphins and tuna swim together. Since 1972 the United States has had a marine Mammals Protection Act (MMPA) to protect dolphins and other species from the worst excesses of tuna fishing in the eastern Pacific. Despite the MMPA over seven million dolphins were killed in tuna harvesting. The act was therefore amended and quotas of dolphin deaths were set for tuna boats, including those from Mexico. Under this US law Mexican boats were allowed to kill 25 percent more dolphins than US boats. Nevertheless, the quota was exceeded, so the US authorities imposed an embargo on Mexican yellow fin tuna. In response, Mexico complained to the GATT trade disputes arbitration system that the US ban was a barrier to trade.

In August 1991 a three-man GATT panel judged that the ban was an infringement upon free trade. As a result, it was decided exports of Mexican tuna should be allowed to resume. The outcome calls into question the ability of nations to use trade as an environmental lever, and may be seen to implicitly assert that trade be accorded a higher priority than the environment. As such, where there is a trade in goods resulting from exploitative or polluting production processes, the GATT judgement may encourage the continuation of

this trade and therefore the continued degradation of the environment. In short, according to GATT it is unacceptable to ban the importing of such goods on the grounds of their being produced by environmentally unsustainable means.

There is, therefore, considerable controversy surrounding trade restrictions based on environmental standards, as is exemplified by the dolphin-tuna affair. In addition, the effects of free trade arrangements, such as the Canada-U.S. Free Trade Agreement and the proposed North American Free Trade Agreement, have been the subject of criticism from a number of sectors, including environmental groups. It has been argued that trade liberalization measures will lead to the relocation of polluting industries to poorer countries, renewed deforestation in favour of agriculture and the loss of policy instruments that governments use to maintain environmental standards, such as the trade sanctions enforcing the Montreal Protocol.

The Effects of Trade Barriers and Production Subsidies

Trade barriers and government subsidies, which Agenda 21 speaks out against on many occasions, can severely distort international trade and facilitate environmentally unsound production. As an example, the United States and the European Community protect their agricultural sectors with price supports and import tariffs. The resulting guaranteed high prices tend to encourage domestic farmers to farm one crop intensively, leading to soil erosion, to a greater use of pesticides, to the draining of wetlands and, to unmanageable surpluses - which are then exported with the help of export subsidies. As a result, world prices for agricultural goods often have little bearing on market based values, further impoverishing farmers in many developing countries.

DCs have in many cases responded to artificially cheap European and US food stuffs by subsidizing the domestic use of pesticides, herbicides, water, fertilizers and machinery, contributing to their overuse and consequent environmental damage. For DC farmers there is an incentive to expand production to make up for lost income by environmentally unsustainable intensive farming of existing land and bringing marginal land, including wetlands, into use.

Trade liberalization measures, it is argued, would lower barriers and export subsidies and would bring prices more in line with what the market will bear. DC production would than be competitive in its own right, and export earnings would be realized. The consequence would be a reduction in the need for DCs to artificially enhance production, often at the environment's expense. As such, trade liberalization can be said to actually reduce damage to the environment. With higher market driven world prices for agricultural goods, farmers in DCs would be provided with more income to invest in fallow land, thus reducing such

environmental stresses as soil erosion and pesticide use, and there would be a concomitant reduced need for distorting and often environmentally harmful subsidies.

Making Trade Liberalization and Environmental Preservation Mutually Supportive

In addressing matters relating to trade and the environment it is important for public policy makers to appreciate the contribution of global economic forces to global ecological change. The need to make trade liberalization and environmental preservation mutually supportive, (as is explicitly called for in Chapter 2) therefore, must be understood by trade policy makers if sustainable development is to be achieved and maintained.

As an example of the symbiotic relationship between trade and environmental policies one may observe the experience of commodity markets. Global commodity markets have been depressed since 1980, and long-term trends suggest that prices of many commodities exported by DCs - mainly to developed countries - will have fallen by 50% in real terms over the half-century 1950-2000. Unfortunately, rather than undertake economic restructuring exercises to deal with such realities, many countries (particularly in Africa) have seen little choice other than to increase their production of commodities to maintain export earnings. However, the consequence of such action by several exporting countries is to put further downward pressure on prices and to place possible socially and environmentally unsustainable demands on the land's productive capacity. As previously noted, the added effect of subsidies to encourage environmentally and/or economically unsound production exacerbates an already-tenuous situation. Trade liberalization, therefore, may prove futile in promoting sustainable development in the absence of domestic economic strategies which are neither environmentally tenable nor globally competitive.

Notwithstanding associated environmental concerns, the trade liberalization initiatives promoted by Agenda 21 may offer new trading opportunities for which Canadian industry should be positioning itself. With the Canada-US Free Trade Agreement and the North American Free Trade Agreement (NAFTA) Canada will, by design or by default, likely be developing new centres of expertise over the coming years. Selling this expertise in the global arena will be a challenge for Canada, but it is a challenge with a potentially high payoff - and one which may be made easier with further global trade liberalization as espoused by Agenda 21.

Concurrent with the benefits for Canada of trade liberalization are risks associated with the uncertainty of protectionist action taken by trading partners. This action may, of course, be taken for a variety of reasons, including trade restrictions based on the previously discussed environmental standards prevailing in importing countries. Canada has the world's seventh largest

economy, and seventh largest import market and export share with more than a quarter of GDP and some three million jobs directly dependent on exports. Yet as a developed country with a relatively high dependence on trade in natural resources, rather than highly manufactured or service exports, Canada is more vulnerable than its G-7 peers to rising international protectionism, particularly in the form of restrictions on environmental grounds. (19) As such, there is a clear incentive for Canada to encourage GATT to assign priority to harmonize the application of trade rules relating to trade and the environment. Indeed, this message was clearly conveyed by the Prime Minister at UNCED when he said, "And once the current Uruguay Round of global trade negotiations is complete, Canada will support a further round of negotiations in which environment will be a focal point."

Environmental Regulation and Trade

There is a body of theoretical knowledge suggesting that trade policy and environmental policy can act as complements in the development of conditions within which firms can innovate and become more internationally competitive. Some economists maintain that companies which operate within tough domestic regulatory environments are often the most able to compete internationally.(20) This assertion is based on evidence indicating that while high environmental standards may initially erode the competitiveness of a company, the innovations generated by such standards increase competitiveness over time. The lesson for Canada appears to be that if centres of excellence in various technologies are developed in response to stiffening environmental standards, there will likely be an export market awaiting exploitation - particularly with further trade liberalization.

Environmental regulations, therefore, need not be seen as the antithesis of a robust economy, but as a facilitator and promoter of environmentally sustainable economic growth. Germany, for example, has extremely stringent air pollution regulations, yet German companies are leaders in patenting and exporting air pollution (and other environmental) technologies. Americans are export leaders in pesticides and chemicals - areas where U.S. regulations are some of the toughest in the world. Perhaps even more revealing, Britain, which has allowed its environmental standards to slip over recent years, has seen its ratio of exports to imports in environmental technology fall from 8:1 to 1:1 over the past decade.(21)

Moreover, although there are examples of environmental costs influencing decisions regarding plant location, there is evidence that such relocation has not generally occurred. Factors such as labour availability and quality, wage rates, supporting infrastructures, tax incentives, market size, transport costs and country risk typically prove much more important than the cost of

meeting environmental regulations in making investment decisions. In addition, companies are increasingly being judged in the marketplace based on their environmental credentials - while good environmental practices are good business, the converse appears to be equally true.

Summary

In moving toward sustainable development, there is little debate on the merits of global trade liberalization to generate wealth and create autonomy for developing countries. However, two potential hindrances to this process are apparent - one is systemic and the other ecological. The former refers both to current international trade disputes which could restrict trade liberalization initiatives and to the need for trade dispute mechanisms to handle trade matters and environmental interests. In addition, in the absence of domestic policies which discourage environmentally unsound production processes, trade liberalization by itself would be insufficient to promote sustainable development. For example, unless the real costs of production, including the environmental costs (Please see discussion of **Environment as a Valuable Resource** theme) are included in the final price of the article, lowering tariff barriers imposed on unsustainably produced items allows industries to avoid facing up to the full costs of production. As a result, these costs may be passed on in the form of pollution or a depleted resource base - undermining trade liberalization's objective of encouraging sustainable development.

The second potential hindrance concerns the capacity of the environment to support the trade growth necessary to help enable sustainable development to proceed. The two potential hindrances are not mutually exclusive. Economic restructuring away from production which is environmentally unsound may, for example, be politically, technically or economically difficult in the short-term, but can encourage a mutually supportive trade-environment interface in the long-term.

Ensuring trade liberalization occurs in an environmentally sustainable fashion will undoubtedly be a substantial challenge. This is particularly so in view of the projected growth in population and in economic output necessary to support this growth. There appears, therefore, to be a fine line between Agenda 21's objectives of both promoting economic growth, through such measures as trade liberalization, and of encouraging environmental preservation at regional and global levels. It is evident that for sustainable development to be pursued through trade liberalization measures, the fine line must be identified before it can be walked.

THEME 3 ENVIRONMENT AS A VALUABLE RESOURCE

"We do not inherit the earth from our ancestors, we borrow it from our children" - generational accounting

Introduction

Pervasive throughout Agenda 21 is the recognition that the environment has a real if often intangible **value**, and that society can simply no longer afford to consider environmental **inputs** (e.g., air, water and soil), as free externalities. One of the main messages which came out of UNCED and which is reflected in Agenda 21, is that if the environmental **costs** (e.g., pollution, resource degradation) and inputs of socio-economic activities are not identified and internalized into economic decision-making processes, then hopes of achieving sustainable development will be largely in vain. In the discussion which follows, some of the recent thinking which has been applied to accounting for the environment in the context of economic decision-making is reviewed.

Economics and the Environment

Economic choices must be made by public and private sector decision makers in prioritizing the many expensive activities recommended in Agenda 21. The utility of these choices will only be as valuable as the economic and accounting information made available to decision makers. As such, the costs of implementing Agenda 21, (and the Climate Change and Biodiversity Conventions), demand that valuation exercises be undertaken with regard to environmental resources often having no readily identifiable market values. It is easy, for example, to put a market price on a tree in terms of the board feet of lumber it contains. That price, however, takes no account of its value as a mechanism for preventing soil erosion, as a home for rare birds or insects, for aesthetic enjoyment, or as a store of carbon dioxide that might otherwise add to the greenhouse gases in the atmosphere if the tree were cut. In addition, market distortions which affect price information available to decision-makers can have a highly perverse effect on resource values and thus on the quality of decisions affecting the environment. For example, subsidies which are directed at supporting various primary industries, such as agriculture, fossil fuel exploration and development and hydroelectric development, may seriously undervalue the product purchased by the end user. Regarding energy usage, for instance, for every dollar Canada spends to subsidize energy efficiency programs, one hundred dollars is spent to subsidize the further use of fossil fuels, thereby underwriting global warming with Canadian tax dollars.(22) The result of such subsidies may, therefore, constitute an incentive to damage the environment at a cost to the taxpayer. If Canada is to meet Agenda 21 objectives and

be serious about taking measures identifying the full costs of its environmental inputs and costs, the use of such subsidies must be questioned. The concern over subsidies was not lost on the authors of Agenda 21; references to the need to scrutinize the environmental and economic effects of various government subsidies appear in six Agenda 21 chapters.(23)

As presently employed, Gross Domestic Product (GDP) is defined as the total value of production within a region over a specified period of time. Generally, GDP is measured on the basis of market prices which can be measured accurately with observed economic transactions. Not taken into account, however, is the depletion and degradation of natural resources which accompanies the human economy. As one author on the subject of environmental accounting has noted: "A country could exhaust its mineral resources, cut down its forests, erode its soils, pollute its aquifers, and hunt its wildlife and fisheries to extinction, but measured income would not be affected as these assets disappeared.(24) GDP, therefore, reflects an increase whenever additional goods and services are purchased. The Exxon Valdez disaster, for example, resulted in an increase to annual GDP due to the additional expenditures on the goods and services ($1.25 billion U.S.) needed to clean up the mess. Traditionally, this increase in GDP has been regarded as positive - an indication that the economy is expanding. Obviously, something is wrong when an environmental disaster translates into good news for the economy. There is, in addition, no means to reflect in financial statements the long-term reduction in future potential GDP caused by current loss of natural capital (25) productivity. Similarly, intergenerational equity issues cannot be easily identified and incorporated into GDP in the context of current short-horizon political, economic and accounting models. Policy makers can, therefore, permit depletion/degradation of natural resources today to enable GDP to grow at a higher rate, thus sacrificing possible future growth and the welfare of succeeding generations.

Thresholds to Human-Made Capital Accumulation and Natural Capital Usage

There is mention in Agenda 21 that fundamental changes will be required in norms relating to consumption patterns (Chapter 4) and resource valuation (Chapter 8) if sustainable development is to be realized. Common to these and other chapters is the recognition that the monetary value of environmental resources must be incorporated into public and private decision making at all levels of society. What is needed to meet such an objective would appear to be nothing short of a revolutionary rethinking of the socio-economic models which have remained largely intact for centuries. This rethinking may ultimately manifest itself in major structural changes to Canada's determination and sharing of wealth, both domestically and with the world at large. It is important,

therefore, to overview what policy and structural changes may evolve over coming years and on what their implications for Canada will be.

Beyond some point in the accumulation of human-made capital it is clear that the limiting factor on production will be remaining natural capital (e.g., clean air and water, soil fertility, ocean productivity). For example, the limiting factor on fish catch is the reproductive capacity of fish populations, not the number of fishing boats. Knowing the point at which natural capital usage has reached the point of unsustainability is, however, often difficult to gauge. Because of the complementary relationship between human-made and natural capital in economic processes, the very accumulation of human-made capital puts pressure on natural capital stocks to supply an increasing flow of natural resources. When that flow reaches a size that can no longer be maintained, there is a temptation to supply the annual flow **unsustainably** by liquidation of natural capital stocks, thus postponing the collapse in the value of the complementary human-made capital. The recent case of the collapse of the east coast fishing industry - idle fishing plants a case in point - is a classic example of the results of natural capital depletion.

It has been argued that the evolution of the global human economy has in fact already passed from an era in which human-made capital was the limiting factor in economic development to an era in which remaining natural capital has become the limiting factor. (26) The limits are both the capacity of the environment to serve as a waste sink for human activity and the "critical" resources - such as the ozone layer, the carbon cycle and the Amazon forest- that play no direct part in world commerce but that serve the most basic economic function of all, which is to enable human beings to survive. Economic logic suggests that the productivity of the scarcest factor should be maximized and that efforts should be directed at increasing its supply. Therefore, economic policy should be designed to increase the productivity of natural capital and its total amount, rather than to increase the productivity of human-made capital and its accumulation, as was appropriate in the past when it was a limiting factor.

It is the contention of Brundtland and Agenda 21 that the flow of natural resources (and the stock of natural capital that yields that flow) is largely substitutable by human-made capital founded on the application of continuously evolving technical efficiency and knowledge intensity. Theoretically, therefore, economic growth can proceed in a manner which relies less and less on the planet's natural capital base. Various authors on the subject however, argue persuasively that this contention is invalid. (27) Instead, it is suggested, human-made capital and natural capital are complements to one another rather than substitutes. The productivity of human-made capital is increasingly limited by the decreasing supply of complementary natural capital. Of course, in the past when the

scale of human presence in the biosphere was low, human-made capital played the limiting role. The switch from human-made to natural capital as the limiting factor is thus a function of the increasing scale of the human presence. In view of human population projections over coming decades, the starkness of these limits to natural capital will most certainly be evident to all, and one would expect consumption patterns to be affected accordingly. (See discussion of Chapter 4 in Section II)

How then, does this brief theoretical discussion on human-made and natural capital interface with possible changes to existing economic models of consumption and production? It is safe to conclude that in pursuing modes of sustainable development, investment must shift from human-made capital accumulation towards natural capital preservation and restoration. Also, technology will have to be more and more aimed at increasing the productivity of natural capital rather than that of human-made capital. This process would occur through market forces alone if the price of natural capital were to rise as it became more scarce. But natural capital has no explicit market driven price and tends to be exploited as if its price were zero. It may, therefore, be contingent upon governments to provide the economic incentives to encourage industry to innovate in areas in which market incentives alone are insufficient. Notwithstanding the clear environmental benefits from providing such incentives, the market opportunities which will develop for companies having the lead in innovative environmentally sound technologies (ESTs) should not be understated. Canada's EST industry, undeveloped as it now is, has potential to capitalize on these market opportunities, particularly if assisted by well thought out government incentives.

Sustainable Income

Concerns over the need to incorporate environmental costs into income measurement have given rise to the concept of **sustainable income**, which is very much subsumed within the sustainable development framework. Sustainable income may be seen as the flow of goods and services that the economy could generate without reducing its productive capacity - that is, the income that it could produce indefinitely. There is little doubt that the notion of sustainable income is highly relevant to the adoption of Agenda 21 initiatives. As seen in the review of Agenda 21 chapters in Section II, much emphasis is placed on encouraging the use of market forces and private sector initiatives to bring about sustainable development. As a result, it is critical that private enterprise, as well as governments, be provided with the tools needed to effectively reflect the environmental costs of doing business into their financial statements. Therefore, on a macro or national scale, GDP determination needs to be adjusted to reflect environmental costs and benefits, while concurrently, on a micro scale, the financial statements of individual enterprises also need

such adjustment. To calculate these adjustments, a means to subtract from GDP or operational income any depreciation in natural capital must be devised. In addition, expenditures to combat degradation of an environment solely to retain the status quo must be noted (e.g., adding lime to lakes to combat effects of acid rain). These expenditures are known as "defensive" expenditures, since costs are being incurred which effectively defend against a loss of environmental welfare. As well, the monetary costs which need to be undertaken to restore a polluted site or ecosystem are also included in the calculation of sustainable income, since if degradation is to be avoided, these costs must be assumed as a necessary expense.

The notion of sustainable income, therefore, captures the idea of a constant capital stock - both physical and environmental - and, as seen in the discussion of Agenda 21 Premises, is at the heart of much of the discussion on sustainable development. Sustainable income then, may be described as:

SUSTAINABLE INCOME = MEASURED INCOME - "DEFENSIVE" EXPENDITURES - MONETARY VALUE OF RESIDUAL POLLUTION - DEPRECIATION OF MAN-MADE CAPITAL - DEPRECIATION OF ENVIRONMENTAL CAPITAL (ECOSYSTEM FUNCTION DAMAGE, RENEWABLE CAPITAL, EXHAUSTIBLE CAPITAL) **(28)**

Measurement of environmental capital depreciation is both an inexact and expensive proposition. Nonetheless, the process offers at least a rough means to identify whether commercial activities are analogous to living off the **interest** of the natural capital base, or in fact whether the **principal** available to support future generations (or life itself for that matter) is being depleted. This type of knowledge is crucial when framing public policies aimed at sustainable development.

Measurement of Natural Capital

To help identify and value natural capital constituents, several countries, including Canada, Norway and France, are in the process of measuring the stocks and flows of various natural resources. In the case of Canada, this information is being catalogued into the System of National Accounts (SNA). The (SNA) was originally published by the UN in 1953 as a framework for measuring economic activity. The SNA is universally adopted by most countries and stands as the accepted economic accounting system. More specifically, it "provides a comprehensive accounting framework for the compilation and presentation of macro-economic data in a format which is designed for purposes of economic analyses, policy making and decision taking." **(29)** Statistics Canada prepared a background paper on Satellite Resource Accounting in 1989.**(30)** Conceptual work for sub-soil and forestry resource accounts has been undertaken and a framework for oil and gas accounting is near completion pending further data collection. This resource information is, therefore,

physical in nature, rather than monetary. It is Canada's intent to develop an inventory of data bases for environmental reporting. It is expected that the resource accounts will evolve into a more comprehensive system as refinements to resource inventories, economic evaluations, and economic evaluations are incorporated. Survey work is currently being done which will identify industrial capital and operating expenditures for pollution abatement. Incorporating these expenditures into satellite accounts to the national accounts has been considered, and industry appears willing to co-operate in providing the data. (31)

As currently constituted, the United Nations SNA does not fully allow for changes over time in the natural capital base. There are no investment or depreciation entries, for example, which reflect growth in renewable resources such as forests and fisheries; or for discoveries such as new oil fields; or for depletion in the asset base of resources such as these. This weakness in the UN SNA is not addressed in Agenda 21. However, any productive commercial activities relating to these assets are included in income. The UN has, however, approved accounting for natural assets in a proposed accounting framework which takes into account the value of resource and environmental assets as well as the economic impact of using these assets. This proposed system is known as the System for Integrated Environment and Economic Accounting (SEEA). However, the method by which resource depletion or accretion should be accounted for in this framework has not yet been agreed upon. Clearly, the sooner a comprehensive accounting framework is developed and implemented by the UN, the easier it will be to meet the Agenda 21 goal of explicitly valuing the environment in decision-making processes.

Even without a monetary valuation, it is possible to fit the physical identification of resource stocks and flows into an accounting framework. As with all accounting systems, the objective of environmental accounting is to:

(i) prepare a "balance sheet" giving a profile of what stocks of the resource are available at a given point in time,

(ii) prepare an account of what uses are made of these stocks, what sources they are derived from and how they are added to or transformed over time, and,

(iii) ensure that the stock accounts and the flow accounts are consistent, so that the balance sheet in any year can be derived from the balance sheet of the previous year plus the flow accounts of that year.

Hence, although one may tend to think of "accounts" in monetary terms, there is no reason why such accounts cannot be presented in physical units. This presentation is possible provided the stocks and flows are clearly identified and a reconciliation between the

sets of stock and flow accounts is achieved, as described above. The data collected in this exercise can be used to prepare forecasts of future use of natural resources and their associated environmental impacts. Nonetheless, while physical accounts have a useful role to play in quantifying the interlinkage between environment and economy, they have limitations. First, they lack a common unit of measurement and, second it is impossible to gauge their importance relative to each other and to the non-environmental goods and services. Third, the nature of present traditional accounting models is inadequate to the task of addressing questions of intergenerational equity or of incorporating non-market value items into financial statements. Moreover, traditional accounting models are limited due to their predominantly retroactive nature - they offer little to guide future decision-making processes. More precisely, in today's world, characterized as it is by increasing degrees of chaos, uncertainty and unpredictability, last year's profits are becoming more and more irrelevant in terms of predicting tomorrow's economic success or failure. There is, for example, little room in traditional accounting for setting up contingencies for future environmental liabilities. Yet, with current and proposed legislation in Canada and the U.S.A. a company may indeed be held environmentally liable for damage caused by the company or its predecessors decades ago. In keeping with Agenda 21's objectives, Canada and other nations will need to take steps to facilitate the evolution of accounting and economic models to incorporate environmental parameters which can no longer be ignored. (While much has been written about environmental accounting at the national level, there has also been some recent work on the subject of environmental accounting at the **micro** (i.e., company)) level.**(32)**

Canada, through its Green Plan, is presently devoting $500 thousand per year to its program to identify resource stocks and flows. This amount is scheduled to increase by some 33% annually over the next several years.

Discount Rates and the Environment

Because Agenda 21 relies heavily on private investment initiatives to achieve sustainable development, some attention must be devoted to discussing the discount rate choices associated with capital investments and their possible long term environmental ramifications. The choice of discount rate prevailing in the market is known to have a direct effect on the rate of exploitation of natural resources and, as such, raises questions regarding intergenerational equity. The basic decision with regard to such resources is how much to consume now and how much to hold in store for future consumption. It is intuitively clear that this decision is going to be influenced by the price of present versus future consumption - that is, the discount rate. The higher the discount rate the more likely financial resources will be directed at short

term investments. With a high discount rate, therefore, fewer capital investments are undertaken, particularly investments with long term payoffs and large initial costs. These include, for example, investments into roads, power stations, and dams. From an environmental perspective, the higher the discount rate the more likely will be the preservation of certain natural areas, since it will not pay to build large scale projects which may be environmentally harmful. On the other hand, higher discount rates imply a more rapid development of exhaustible resources. In the case of non-renewable energy resources, for example, high discount rates may encourage stocks to be depleted more quickly than with lower rates. When plugged into current economic and pricing models, the incentive would be to consume what is available in the short term with little attention paid to ensuring long-term supplies. As such, under the high discount scenario, there would be less of an incentive for industry to invest into long term projects (e.g., relating to renewable energy research and development) which could serve as substitutes to rapidly vanishing non-renewable energy sources. There seems, therefore, to be environmental costs regardless of the discount rate used - the question is only the type of costs.

As a corollary to the aforementioned effects of discount rates, long term environmental impacts can also be directly affected by the level of discount rate used today. For instance, present value considerations relating to projects with potentially catastrophic consequences cannot be adequately reflected in current financial statements. A simple example illustrates the problem. Assume a particular project is believed to involve the probability of a major catastrophe through soil contamination in a hundred years time. The cost of removing this contamination is estimated in today's dollars at $100 million and the probability that it will occur is thought to be 0.5. The expected cost in 2093 is consequently $50 million. Discounted at 10% per annum, the present value of the damage is $36, at 5% it is $3802 and at 2% it amounts to $69,016. Although the discount rate makes a considerable difference to the discounted present value of the cost, none of these figures is likely to sway the decision on the justification of the project. Hence, there is a real concern that, with discounting, the true importance of future environmental costs cannot be made available to today's decision makers. As such, with respect to questions of intergenerational equity and natural capital maintenance, little solace can be derived from the use of present models of capital investment decision making; discounting appears to shift the burden of environmental costs to future generations, and it precludes future generations from inheriting undegraded or undepleted natural capital. There is no specific mention in Agenda 21 of the need to revamp capital investment decision making criteria to allow for the needs of future generations.

High discount rates, which may be acceptable on normally conceived

economic grounds, can therefore have undesirable consequences for projects involving natural resources. In spite of this, however, some have argued that encouraging the use of a lower discount rate is not the best policy to follow with regard to natural resources. (33). First, there is the question of which project should qualify for lower than market discount rates. Inevitably there will be grey areas which would cause further problems, in terms of equity for example. Second, even if one used lower discount rates, there is no guarantee that some serious resource degradation might not occur. Indeed, to apply discount rates to broad questions, such as whether to invest today in saving the rainforest or to allocate resources to combat global warming, is largely irrelevant. Using discount rates to make investment decisions that will affect future generations means assuming that today's generation can accurately predict the preferences of posterity. Moreover, as is shown above, even at a modest discount rate, no investment will look worthwhile when projected several generations into the future; although where an environmental decision has irreversible effects, the cost to future generations may be infinite.

Finally, when one factors in the effects of inflation to conventional capital investment analysis, it is apparent that inflation is lethal for the environment. The effect of inflation on discount rates explains the harm. High inflation puts a premium on consuming now rather than next year - never mind leaving resources for future generations. More specifically, inflation tends to drive up demand for tangible resources, such as land. Greater demand for land drives up property values giving the monetary value of the land an edge over the environmental value of whatever happens to be there. A property boom, therefore, shifts the balance in favour of development and away from environmental preservation. As such, the design of macroeconomic policies can, in the inflationary scenario, lead to wholly unnecessary and artificially induced environmental stress. Conversely, macroeconomic policies can be good for the environment if they foster economic stability which includes clear price signals on environmental costs and benefits and which allow economic instruments to be applied in environmental planning practices; such policies aid and abet rather than hinder the development and application of environmental accounting practices.

Summary

As Agenda 21 calls for massive direct and indirect infusions of wealth from developed to developing nations, the efficacy of wealth allocation decisions will become increasingly important. In addressing questions of long-term social-economic-environmental welfare, rather than purely short-term economic gain, traditional decision-making practices may be found seriously deficient. As one of the larger donors of aid, Canada has a vested interest in exploring investment decision-making processes which amend conventional value-for-money models to include the environmental

parameters discussed in this theme. A first step would seem to be to continue to pursue means to identify and value the environmental inputs and costs of human activity.

In searching for actions needed to correct the market's failure to capture the full costs of pollution, waste, and resource depletion, the tax system may offer answers. Most governments, including Canada's provincial and federal, have dealt with market shortcomings by internalizing environmental costs through setting "end-of-pipe" regulations. Examples are the requirement that power plants install equipment to capture air pollutants or that pulp and paper companies treat their wastewater in a specified manner before releasing it into nearby rivers and streams. This approach has in many cases measurably improved the environment and is especially important where high-risk activities are concerned, such as disposing of radioactive waste from nuclear power stations. Regulations, however, are also a costly and cumbersome means to achieve broad societal aims. A powerful instrument for fostering environmentally sound economic activity lies in the realm of taxation. By shifting the tax base away from income and toward environmentally damaging activities, governments can reflect new priorities without necessarily increasing the total tax burden. And because taxes adjust prices and let the market do the rest, they can help meet many environmental goals more efficiently than can regulatory mechanisms.

Restructuring the tax base in this way has many advantages. Governments typically raise the bulk of their revenues by taxing income, profits, and the value added to goods and services. This has the unintended effect of discouraging work, savings, and investment - things that are generally good for an economy. If governments substituted taxes on pollution, waste and resource depletion for a large portion of current levies, both the environment and the economy could benefit. Many nations, particularly in Scandinavia, are, in fact, already experimenting with so-called "green taxes". Levies on air and water pollution, waste, noise, and potentially harmful products such as fertilizers and batteries are examples of such taxes. A great deal more could be said on work and writings relating to the emerging potential of green taxes, but, tempting as it is, to do so would exceed the scope of this paper. Interested readers are referred to work by Daly, Repetto and Pearce which are referenced under the notes at the end of this Section.

THEME 4 APPLICATION OF SCIENCE AND TECHNOLOGY IN CAPACITY BUILDING

Introduction

Throughout Agenda 21 is the notion that global sustainable development will only be realized through cooperation amongst all countries. This notion is based on the recognition that DCs must be assisted by developed countries in the attainment of economically and environmentally sustainable growth. Once this growth is achieved, DCs would be capable of meeting their own needs, without having to rely on continuing external assistance. Hence, integral to Agenda 21 is the promotion of "capacity building" in DCs, to be achieved largely through the transfer and application of technology from developed countries. In the context of this report, technology may be understood to be the mix of knowledge, organizations, procedures, machinery, equipment and human skills which are combined to produce socially desirable results. Not addressed in Agenda 21, however, is **how** this transfer may best be undertaken. Consequently, it is the intent of the following discussion to elaborate both on the difficulties concerning technology transfer to DCs and the implications for Canada associated with Agenda 21's capacity building objectives, particularly regarding the application technology.

Technology Transfer and Agenda 21

Technology transfer is central to Agenda 21 objectives for three reasons.

First, of all the disparities between developed and developing nations, the disparity in scientific and technological resources is perhaps the most acute. No matter how much effort is made to develop local capacities within DCs, in the short and medium terms there will be a continuing need for technology transfer. This is particularly true in the context of current environmental debates, where the challenges facing the international community (e.g., finding chlorofluorocarbon substitutes, developing new energy sources) are urgent.

Second, a commitment to increase the flow of environmentally sound technology may be an important means of countering some of the other trends at work in the international technology market. Problems of indebtedness and the shift of industrialized country investment away from DCs have meant that commercial flows of technology from developed to developing countries have stagnated or declined over the past decade - with the exception of flows to some of the newly industrializing countries in East Asia. Concurrently, 'high technology' sectors with potentially important roles in supplying environmentally sound technologies (e.g., biotechnology, advanced composite materials) have been subject to strong trends

toward the privatization of research, which has in turn, reduced the general accessibility to these technologies.

Third, the link between technology imports and technological capabilities in the use of imports is by no means automatic; it largely depends on the local policy and institutional context, and on the specific terms and conditions under which technology is transferred. Consequently, the concern with the economic and environmental efficiency of a given technological solution needs to be matched with a concern for its integration into the local productive structure, the conditions by which it is acquired, and the extent to which technical hardware imports are accompanied by effective transfers of knowledge and capabilities. (34)

Economic and ecological interdependencies among nations effectively preclude any one nation from undertaking sustainability initiatives entirely in isolation of others. This restriction is particularly true for DCs; with fewer resources and, in many instances, deeper and broader environmental problems than developed countries, DCs are dependent upon scientific, technical, administrative and financial assistance from developed countries to meet their Agenda 21 commitments. In recognition of this need, all Agenda 21 chapters emphasize the important role of technology transfer in capacity building. Most programme areas described in Agenda 21 chapters have sections directed at the roles of "scientific and technological means", "human resource development" and "capacity-building".

The **scientific and technological means** section of Agenda 21 chapters emphasizes the importance of application and sharing of scientific and technological capabilities toward sustainable development endeavours. The section on **human resource development** speaks of the need for available skilled personnel to implement Agenda 21's recommended activities. In particular, special emphasis is placed in most chapters on including and enhancing the role of women in promoting sustainable development. Chapter 24 (**Global Action for Women**) is devoted exclusively to this subject. The **capacity building** section of each chapter refers to the need to have domestic policies and public and private institutional, legislative and management frameworks which promote sustainable development practices. As stated in Chapter 37 (**National Mechanisms and International Cooperation for Capacity Building in Developing Countries**):

> "The ability of a country to follow sustainable development paths is determined to a large extent by the capacity of its people and its institutions as well as by its ecological and geographical conditions. Specifically, capacity-building encompasses the country's human, scientific, technological, organizational, institutional and resource capabilities. A fundamental goal of capacity-building is to enhance the ability to evaluate and address the crucial questions related to policy

> choices and modes of implementation among development options, based on an understanding of environmental potentials and limits and of needs as perceived by the people of the country concerned. As a result, the need to strengthen national capacities is shared by all countries."

In addition to chapter 37, a chapter is also devoted to technology transfer - a central constituent of capacity-building. (See Chapter 34 - **Transfer of Environmentally Sound Technology, Cooperation and Capacity Building**). For specifics on this chapter please refer to Section II.

Economic Implications for Canada

There exist a number of economic implications for Canada with respect to this theme. The most significant of these implications concerns the commercial opportunities provided through technology transfer to DCs to facilitate capacity building. There are, in addition, benefits to technology suppliers beyond the direct financial compensation involved in a given transaction:(35)

- expansion of export opportunities of spare parts, auxiliary equipment and products supporting the initial transaction;

- increased efficiency of the transfer process itself, as suppliers learn to master the legal, managerial and technical challenges involved in technology transfer;

- enhanced competitive position of supplier firms vis-a-vis international competitors, particularly in cases where home markets are too small to permit economies of scale;

- improving the productivity of input and component suppliers, as a result of the transfer of new generations of production technology; and

- two-way flows of knowledge, in which suppliers benefit from process or product adaptations pioneered by recipients.

Transfer of technology may therefore play a role in enhancing the competitiveness of Canadian environmental industries, particularly in areas where Canada has an established reputation (energy efficient technologies, remote sensing or waste-water management for example). Ideally, Canada should seek out 'win-win-win' technology transfer situations - that is, initiatives which meet the developmental needs of DCs, the commercial needs of technology suppliers, and the environmental needs of the planet.

Canada has taken the position that in the case of commercially-

developed, proprietary technology, recognition of intellectual property rights is essential to the continued development of technologies. At the same time, Canada has resisted pressures from DCs to unilaterally extend property rights into new and controversial areas, particularly regarding living organisms.

In addition, Canada's position has been that in the case of privately-owned technologies, market rates of return should form the basis for compensation to the owners of technology. On the other hand, it is Canada's view that DCs should be provided with concessional financing needed to allow them to make such purchases, and should be assured that such financing would be additional to existing commitments for development assistance. Please refer to the review of Chapter 34 (**Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building**) in Section II for a more complete discussion of intellectual property rights issues.

The content of this theme is consistent with current capacity building activities on the part of Canada's domestic institutions - particularly the International Development Research Centre (IDRC). IDRC has a long-standing mandate to support the development of research capacity in DCs. In view of the demand placed in Agenda 21 upon increased capacity building activities, the opportunities for both further IDRC and Canadian industry involvement in meeting this demand are clear. At UNCED, Prime Minister Mulroney announced an expansion to IDRC's terms of reference so that the agency can do more to encourage sustainable development. In addition, to strengthen links between the international community and IDRC, the Prime Minister invited the Secretary General of the UN to nominate, on behalf of the organizations's specialized agencies, the 10 non-Canadian members who sit on the Centre's board of governors. This enhanced linkage is in line with the objectives contained within this theme as it will further enable development agencies to tap into IDRC expertise as they help DCs implement Agenda 21 commitments.

Canada can facilitate technology transfer in a number of ways:
financial and technical assistance for DC policy reform regarding, for example, investment criteria or regulatory standards;
funding of demonstration projects illustrating the technical and economic efficiency of environmentally-sound technologies;
financial and technical assistance to promote technology-sharing arrangements among DC firms; or assistance to improve the technical expertise of local and regional lending institutions in DCs.

Potential Difficulties

Few would suggest that the application of science and technology represents a panacea in achieving sustainable development; it is but one component having only the potential to offer a contribution in this regard, albeit a major one. There are, indeed, those who

view technology, and the expansionist industrial economic regimes which fuel it, as the root cause of the world's environmental malaise. The merits of this philosophy and what they may portend for the future cannot be dealt with in this report, relevant as they may be to the topic of sustainable development. It may be said, however, that, provided Agenda 21's economic growth ideals are maintained, further technological progress will be necessary to achieve these ideals and, equally, to deal with environmental and other serious issues confronting humankind.

To this end, the benefits of appropriate technology must be accepted as outweighing the costs. It is important, therefore, to identify the difficulties and barriers which may confront the application of technology to DC capacity building. Once identified, it will be easier to gain perspective toward the attainability of Agenda 21's DC capacity building objectives and the Canadian role therein. Some of these difficulties are summarized below. Although the list is not exhaustive, it is indicative of the type of concerns which must be confronted by decision-makers in seeking the most effective means to proceed with Agenda 21 implementation in general, and technology transfer to DCs in particular.

The Social Dimension

Technological progress is not only a matter of innovations and diffusion. It is also a matter of social acceptance. Many innovations have been introduced without proper assessment, sufficient information on their social effects, and adequate public discussion of the inherent benefits and risks. The real or perceived attitude of technicians and decision-makers has often been "We know what is best". As a result, there has often been skeptism and even hostility from the general public towards many technological developments. These attitudes can be exemplified by the confusion, ignorance and fear - not always unfounded by any means - towards, for example, nuclear power or developments in biotechnology.

Therefore, insufficient understanding of positive and negative impacts and of the ramifications of new technologies, coupled with a failure to involve and inform the public, not only can retard technological change but also may lead to social dissension. If technological progress is to be continued with adequate social acceptance it would seem to be necessary that greater efforts be made to assess carefully and objectively the risks and benefits of new technologies and to promote public discussion and participation in the decision making processes pertaining to these technologies. In some cases independent non-profit institutions, of which Canada has many, may be particularly well suited to perform such objective assessments.

International Accessibility of Technology

The extent to which technology is internationally accessible depends on the relevant sectors, but also to a large degree on the structure of a country's technological system. Specifically, whether research is predominantly university-driven with a publicly accessible knowledge base, or whether it is conducted primarily in enterprises where knowledge tends to be more proprietorial have a large bearing on the diffusion and accessibility of technology. The resolution of issues surrounding intellectual property rights, for example, remains a hindrance to the transfer of potentially beneficial technologies to those in DCs which cannot afford the technology.

The DCs face particularly critical challenges and opportunities arising from the intensifying importance of science and technology to sustainable development progress. The DCs can potentially benefit from the whole range of technologies now available. But there is a risk that many DCs could increasingly lose touch with the technological advances being made in the industrialized regions of the world. While some countries in Latin America and Asia, in particular the Dynamic Asian Economies, have clearly improved their capacity to acquire, absorb and adapt a variety of important production technologies, such is not the case for the majority of DCs. Since the early 1980s, the main indicators of the volume of international technology flows - foreign direct investment, capital goods imports, payments for licences and know-how, and official technical assistance - show, with only a few exceptions, a shrinkage of technology flows to most DCs.(36) If this trend is to be halted and reversed, special efforts by the developed nations would seem to be needed. At a minimum, it may be said that resolving how the diffusion of technology can best incorporate the needs of DCs, and how DCs can improve their capacities to absorb technology, are significant issues requiring the attention and efforts of the world community.

At issue, therefore, is not only access to technology, but the capacity to innovate and to diffuse technology. These capacities depend on a wide range of conditions and institutions, some of which are influenced by government policies, but most of which are intrinsically linked with entrepreneurship and cultural endowments, involving technology, management and financial innovation. In looking at opportunities - commercial and otherwise - which encourage capacity building, these type of concerns are important to bear in mind.

Summary

A long-term objective of Agenda 21 is to wean DCs away from foreign aid and towards economic independence. Capacity building through the appropriate application of technology is regarded by Agenda 21

as critical in achieving this independence. However, the efforts taken toward capacity building in DCs will, like Agenda 21 as a whole, depend mainly on the efforts and indigenous resources of DCs. Hence, the need for rational and supportive DC policies to support the appropriate and successful application of science and technology in capacity building is a prerequisite to the international cooperation called for in Agenda 21.

Notwithstanding the qualifications necessary to maximize the contributions of technology transfer, there exists the potential to undertake this transfer in such a manner that benefits both developed and developing country economies and the environment. In essence, if managed correctly, technology transfer can be nothing short of the embodiment of sustainable development.

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over this period. The almost 15 per cent depreciation of the Canadian dollar against its U.S. counterpart from the end of 1980 to the end of 1985 magnified the increase in exposure over this period. Similarly, the 22 per cent appreciation of the Canadian dollar over the subsequent five years to 1991 accentuated the underlying decline in exposure.

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SECTION II

INTRODUCTION

In this Section selected Agenda 21 chapters are reviewed with the intent of:

- -highlighting the basis, objectives and recommendations of the chapter;
- -presenting a discussion of the chapter including, where applicable:
  - •identification of economic implications for Canada;
  - •identification of Canada's current activities and negotiating position respecting chapter contents; and
- -providing a critique of the chapter.

The chapters chosen are those which have the most profound direct and indirect implications for Canada, particularly from an economic perspective.

The Agenda 21 chapters chosen for review are the following:

1) **Chapter 2** - International Cooperation to Accelerate Sustainable Development in Developing Countries and Related Domestic Policies

2) **Chapter 4** - Changing Consumption Patterns

3) **Chapter 5** - Demographic Dynamics and Sustainability

4) **Chapter 8** - Integrating Environment and Development in Decision Making

5) **Chapter 10** - Integrated Approach to the Planning and Management of Land Resources

6) **Chapter 11** - Combating Deforestation

7) **Chapter 14** - Promoting Sustainable Agriculture and Rural Development

8) **Chapter 15** - Conservation of Biological Diversity

9) **Chapter 16** - Environmentally Sound Management of Biotechnology

10) **Chapter 17** - Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi-Enclosed Seas, and Areas and the Protection, Rational Use and Development of Their Living Resources

11) **Chapter 18** - Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources

12) **Chapter 19** - Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products

13) **Chapter 20** - Environmentally Sound Management of Hazardous Wastes, Including Prevention of Illegal International Traffic in Hazardous Wastes

14) **Chapter 30** - Strengthening the Role of Business and Industry

15) **Chapter 31** - Scientific and Technological Community

16) **Chapter 33** - Financial Resources and Mechanisms

17) **Chapter 34** - Transfer of Environmentally Sound Technology

18) **Chapter 37** - National Mechanisms and International Cooperation for Capacity Building in Developing Countries

19) **Chapter 38** - International Institutional Arrangements

CHAPTER 2 - International Cooperation to Accelerate Sustainable Development

The purpose of this chapter is to provide a framework of recommended activities which promote global sustainable development through increased integration of the international economy. This purpose is to be fulfilled through the following programme areas:

1) Promoting sustainable development through trade liberalization;
2) Making trade and environmental preservation mutually supportive;
3) Providing increased financial resources to developing countries and dealing with international debt; and
4) Encouraging macroeconomic policies conducive to environment and development.

Each of these programme areas is outlined as follows:

Promoting sustainable development through trade

As described in the introduction to this report, a number of common themes become apparent on examination of the Agenda 21 document. Among these themes, and one which is addressed in some detail in Section I of this report, is the emphasis placed upon trade liberalization as a means to transfer wealth to developing countries. The belief held by the authors of Agenda 21 is that this wealth will engender the means to more fully protect the environmental base on which humankind depends. It is suggested in this programme area that trade liberalization may be brought about through a number of measures, including improving access to markets (particularly commodity based) for DC exports; ensuring environment and trade policies are mutually supportive; continuing to apply compensation mechanisms for shortfalls in commodity export earnings of DCs to encourage diversification efforts; and supporting the efforts of DCs to promote the policy framework and infrastructure required to improve the efficiency of export and import trade.

Making trade and environment mutually supportive

The intent of this programme area is to highlight the increasingly interdependent nature of economic growth and environmental preservation. It is emphasized that trade policies which are open and multilateral and which are supported by sound environmental policies would have a positive impact on the environment and contribute to sustainable development. A noteworthy objective from EAITC's perspective is the importance attached to encouraging GATT, UNCTAD, and other relevant institutions to "develop more precision, where necessary, and clarify the relationship between GATT

provisions and some of the multilateral measures adopted in the environment area".

A host of proposals are offered aimed at meeting the objective of making trade and environmental preservation mutually supportive. The general nature of these proposals is to ensure that the root causes of environment and development problems are dealt with such that the adoption of environmental measures which result in unjustified restrictions on trade is avoided. Emphasis is placed on clarifying the relationship between GATT provisions and those multilateral measures adopted in the environmental area. Clearly, the authors of Agenda 21 are concerned both that subsequent trade agreements should be multilateral in nature and that International Environmental Agreements (IEAs) be sufficiently flexible to respond to new and unforeseen needs for the protection of the environment.

Providing adequate financial resources to developing countries

This programme area centres on the need to provide investment to DCs to enable these countries to practice sustainable development. Many DCs have experienced a decade-long situation of negative net transfer of financial resources, during which their financial receipts were exceeded by payments they had to make, in particular for debt-servicing. External indebtedness is cited in this programme area as the "main factor in the economic stalemate in the developing countries". This programme area advocates a number of measures to address the debt problem, including:

-commercial bank debt reduction negotiations;
-strengthened policies to attract direct investment, avoid unsustainable levels of debt and return of flight capital;
-bilateral debt reduction on the part of creditor countries;
-support of multilateral financial institutions in the form of new disbursements.

Please refer to Section I for a discussion of issues relating to DC debt.

Encouraging macroeconomic policies conducive to sustainable development

This programme area notes that before sustainable development can become a reality, many DCs must make progress in designing and implementing policies relating to effective, corruption free and socially beneficial public spending. Correction of exchange rate distortions and encouragement of entrepreneurship are also seen as necessary steps to be taken by many countries. Also acknowledged is the need to incorporate social and environmental costs in resource pricing - as discussed in Section I, this is a theme which appears throughout Agenda 21. A number of proposals to meet these needs are offered. Most of these proposals seek to promote economic

cooperation and diversification coupled with transparency and accountability in administration and decision-making.

Proposed activities to promote sustainable development through trade during 1993-2000 would annually cost an estimated $8.8 billion U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 2

Chapter 2 offers a framework of activities and processes necessary to foster the necessary international cooperation required, not so much to "accelerate" sustainable development, but in all likelihood, simply to achieve it. Because of the global nature of so many environmental problems and in view of increasing economic interdependencies among nations, only through effective international cooperation on many fronts can the achievement of sustainable development be contemplated.

Among Canada's main interests in the negotiations of this chapter was to ensure stable and predictable access to export markets in the context of a multilateral trading system and market-oriented economic system. Recognizing that trade and environment must be mutually supportive, Canada continues to support GATT as the international body responsible for international trade rules and their relationship to the environment. In view of the need for providing external finance to DCs as well as debt relief, Canada also highlighted the need for DC policies which encourage domestic savings and promote investment.

As a result of the heavy reliance placed upon trade liberalization and international cooperation in implementing sustainable development policies, EAITC should be aware of and, where applicable, included in the processes needed to meet the objectives outlined in this chapter. Indeed, given both its existing international presence and its involvement in trade related issues, EAITC is well situated to become more directly and indirectly involved in administering policies and programmes which meet these objectives.

Much of the discussion pertaining to this chapter centres on the **Trade Liberalization, Developing Country Debt Relief** and **Environment as a Valuable Resource** themes. Discussion relating to these themes is, therefore, covered elsewhere in this report and is not repeated here. It should be noted, however, that because of the importance placed throughout Agenda 21 on these themes, this chapter is more cross-cutting than most and, as such, is relatively central to the Agenda 21 document as a whole.

Some of the recommendations which are suggested in this chapter are already being followed by several countries, including Canada. For

example, work is continuing on providing debt relief from creditor nations and multilateral institutions (IMF, World Bank) to DCs. Schemes such as debt-for-equity and debt-for-nature swaps are being experimented with by several countries, including Canada, particularly in Latin American countries. For example, at UNCED Canada announced a decision to convert up to $145 million CDN of ODA debt in Latin America into local currency to finance environment and other sustainable development projects. So far CIDA has initiated negotiations and is now awaiting proposals from five Central American countries. The proposals will be reviewed by a committee that will give priority consideration to projects that integrate environmental protection, sustainable resource management and social development. These proposals could, for example, include projects integrating pollution control, watershed management, soil conservation, sound forest management, biodiversity conservation, and strengthening of national and community-based institutions.

As discussed in Section I, trade liberalization combined with environmentally benign trading policies are being examined through the GATT. In addition, the recommendation that economic instruments be explored as a means to control pollution is already well underway in several countries, primarily the U.S., and is being considered by others, including Canada.

CHAPTER CRITIQUE

A general criticism of this chapter is that there is simply too much attention devoted to further trade liberalization; this degree of attention is something with which many groups, particularly in the environmental field, have concern. The emphasis in Agenda 21 on the merits of trade liberalization may, for example, be seen as downplaying its possible negative ramifications (e.g., reliance on cash crop production at the expense of the environment and/or the production of foodstuffs for the indigenous population).

The chapter is also criticized for focusing too greatly on economic policies in isolation of other matters needing attention in pursuing sustainable development. These matters include the need for equitable social policies and the pursuit of international political relations supportive of sustainable development policies. However, in view of the importance attached to economic growth by Agenda 21, the chapter's emphasis in this regard is not out of place.

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CHAPTER 4 - Changing Consumption Patterns

The main message of this chapter is that existing patterns of resource consumption are unsustainable and that these patterns must be revised without adding to the economic burdens of DCs or limiting their opportunities for growth. Since the issue of changing consumption patterns is broadly based, it is implicitly addressed in several parts of Agenda 21, notably those dealing with energy, transportation and waste management, and in the chapters on economic instruments (Chapter 8), the transfer of technology (Chapter 34) and demographics (Chapter 5).

This chapter contains the following programme areas:

1) Focusing on unsustainable patterns of production and consumption;
2) Developing national policies and strategies to encourage changes in unsustainable consumption patterns.

The main characteristics of each programme area follow.

Focusing on unsustainable patterns of production and consumption

The primary assertion in this programme area is that, while poverty results in certain kinds of environmental stress, the "major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries...". It is emphasized, however, that more needs to be known about the role of consumption in relation to economic growth and population dynamics to formulate coherent international and national economic policies. It is also recognized that current consumption and production patterns do not meet the needs of sustainable development.

Developing national policies and strategies to encourage changes in unsustainable consumption patterns

To achieve the goals of sustainable development it is acknowledged in this programme area that to do so will "require reorientation of existing production and consumption patterns that have developed in industrial societies and are in turn emulated in much of the world". To make such a reorientation a reality, it is suggested that: production efficiency techniques be promoted; domestic policy frameworks be devised to encourage a shift to more sustainable patterns of production and consumption; and that the transfer of environmentally sound technologies to DCs be encouraged.

A number of recommendations to achieve the above objectives are offered, many of which advocate means to increase efficiency in production so as to reduce resource usage and waste production. The

Environment as a Valuable Resource theme is very much in evidence in this programme area. It is proposed that with the help of economic instruments and open communication to consumers, prices and market signals which accurately reflect the environmental costs of the consumption of energy, materials and natural resources, and generation of wastes can go far toward changing current consumption and production patterns.

DISCUSSION OF CHAPTER 4

In the first programme area, this chapter takes the stance that current consumption patterns are a symptom of the inequality between rich and poor countries and that the disproportionate use of resources is as unbalanced as it is unsustainable. In the second programme area, the causes of unsustainable consumption patterns are largely attributed to a market-failure - an inefficient allocation of resources due to an absence of appropriate market and price signals. The two programme areas, therefore, have quite unique stances vis à vis the matter of consumption patterns. However, in reading between the lines, it is apparent that the issue of **consumption** is approached from the point of view that in itself, it is not wrong. In fact, the message is that, as an expression of consumer preference, consumption may be a powerful force which can be harnessed to serve the interests of environment and development. The challenge would seem to be to direct consumption towards ends which are both environmentally benign and which foster economic growth. The accepting and meeting of this challenge is very much in keeping with Agenda 21's emphasis on the use of market forces to move the world forward on the path to sustainable development.

It is apparent that changing <u>consumption</u> patterns and changing <u>production</u> patterns are two quite different, but equally important phenomena; this distinction is not explicitly recognized in this chapter. The former is based on societal norms, values and expectations, while the latter is founded largely on technological improvements applied to production processes. To a significant extent production patterns in the developed nations are already changing in favour of the environment. Consumer awareness, political pressure, advances in technology, the desire to take a proactive stance on environmental pressures and simply cold economic realities relating to natural resource limitations have, in many industries, collectively spurred more efficient utilization of resources and reduction of wastes in production processes.

Through employing environmentally sound technologies (ESTs), Canada is already a leader in developing sustainable patterns of production. Areas, such as energy efficiency and alternative fuel research and development are among the more obvious. Canada's EST industry is growing at a rate of 5-7% per year, is worth some $7-10 billion CDN and accounts for about 150,000 jobs and may well

provide significant export potential in the years ahead. EAITC could find this industry to be of particular interest and deserving of attention should this potential come to fruition.

The Canadian stance on negotiations leading to this chapter was to shift the often heated debate about consumption patterns away from questions of morality over resource consumption differences among nations to the economics of overconsumption and excessive waste. Canada promoted the use of market mechanisms to assess environmental costs; worked to align the objectives of Agenda 21 with Canada's Green Plan objectives; and encouraged programs that educate and inform consumers about reducing waste and wide choices in the marketplace.

CHAPTER CRITIQUE

Changing consumption patterns may be seen to be at odds with the objective of fostering the economic growth necessary to achieve sustainable development. Indeed, the thrust of this chapter appears to be somewhat in conflict with Chapter 2 (**International Cooperation to Accelerate Sustainable Development**) in this regard. Afterall, to achieve the economic prosperity objectives underlying Agenda 21 (Premise II), would seem to require **increasing** levels of consumption, particularly of DC commodity exports.

There is no emphasis in the chapter on the need for overall limitations on the **scale** of consumption by either developed or developing countries. Environmental damage is a function of the amount of consumption imposed upon finite environmental sinks, combined with the consumption patterns in place. Perhaps, therefore, the problems of consumption scale should have received some attention in this chapter in addition to the problems of consumption patterns.

A further criticism of this chapter is that consumption patterns associated with linkages between poverty and population pressures in DCs are all but ignored; the correlation between economic deprivation and environmental degradation would seemed to have merited explicit mention in this chapter, particularly as it is integral to the subject of sustainable development.

Implicit in the chapter is the contention that while consumption patterns pose a serious threat to the environment and to the achievement of sustainable development, this threat can be resolved largely through conventional approaches (e.g., more research on consumption, encourage recycling). While some mention is given to more drastic measures (e.g., legal or economic instruments restricting consumption, such as carbon taxes), it could be argued that more should have been said on this subject. Afterall, a "reorientation of existing production and consumption patterns" as proposed in this chapter is an ambitious objective by any standard,

and will unquestionably require unconventional and innovative direction if it is to become a reality.

In conclusion, the chapter is relatively weak in that it offers few explicit suggestions and because it does not forcefully convey the reason why there are serious problems associated with current consumption and production patterns. Recommended activities tend to be mundane (e.g., "Expand or promote databases on production and consumption...") or overwhelming (e.g., "Assess the relationship between production and consumption, environment, technological adaptation and innovation, economic growth and development and demographic factors"). As a result, implementation of many of the chapter's recommendations will at best likely be a long-term and probably very amorphous process.

ECONOMIC IMPLICATIONS

In support of Canada's EST industry, several Green Plan initiatives, including Technology for Solutions and the Environmental Innovation Program have been established to promote environmentally sound production processes. These initiatives are consistent with the chapter's objective of asking industrialized countries to consider "substantial technological and other assistance" to DCs to avoid the replication of inefficient consumption patterns of the industrialized countries in their development processes. However, as discussed in the **Application of Science and Technology to Capacity Building** theme, Canada, does not support non-commercial transfers of technology, although funding for technical cooperation and technology transfer is available through current ODA programmes.

This chapter calls for the strengthening of "positive trends and directions which are emerging in industrialized countries" regarding consumption issues. Canada is in a position to play a major role in this area, as it is among the leading countries in such areas as environmental education, packaging and labelling. Nonetheless, the practicality of substantively changing consumption patterns is, as noted in the chapter, not well researched and appears to be much more difficult to achieve than is the changing of production patterns.

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CHAPTER 5 - Demographic Dynamics and Sustainability

The objective of this chapter is to ensure that national policies to encourage sustainable development incorporate the realities of the demographic effects of local populations. These demographic effects refer, in large part, to population movement, population growth, cultural behaviour and human vulnerability in ecologically sensitive areas. This chapter is included in this report out of regard for the enormous implications, economic and otherwise, both in Canada and internationally, which population growth will have over the coming decades. In addition, discussion of population issues forms a necessary complement to other chapters, particularly Chapter 4 (**Changing Consumption Patterns**); changing consumption patterns in a manner which does not undermine either economic growth or environmental integrity is clearly a significant challenge when backdropped by global population increases of several billion over the next 50 years.

Three programme areas are presented in this chapter:

(1) Developing and disseminating knowledge concerning the links between demographic trends and factors and sustainable development;

This would entail research into plans of action and strategies on the interactions between population, natural resources and the environment, and life-support systems.

(2) Formulating integrated national policies for environment and development, taking into account demographic trends and factors;

This area emphasizes the need for all countries "to improve their capacities to assess the environment and development implications of their development trends;.. to address the consequences of population growth..."; and to work to bring about demographic transition within a holistic view of development.

(3) Implementing integrated, environment and development programmes at the local level, taking into account demographic trends and factors.

This area recognizes that population programmes are more effective when implemented within a range of cross-sectoral policies and through an effective local consultative process involving community, women's groups and NGOs.

This chapter is founded on the belief that demographic trends and sustainable development have a symbiotic relationship; one cannot be examined in isolation of the other. Established demographic trends, such as the increasing urbanization of mankind and further population growth of several billion by the middle of the next century, need to be addressed within the framework of sustainable development policies. For example, since large increases in the size and number of cities will occur in DCs, greater attention should be given to improved municipal management and local government capabilities. The chapter emphasizes the need to undertake further research into the relationships among demographic dynamics, technology, cultural behaviour, natural resources and life support systems. It is recommended that particular attention be devoted to encouraging the role of women in developing and implementing population/environment programmes.

The authors of this chapter see a major role for multilateral institutions, non-government organizations and various UN bodies, to provide research and administrative support to DCs regarding demographic issues. This support would help DCs to implement sustainable development policies which are compatible with national demographic factors.

The Conference secretariat has estimated that the average total annual cost (1993-2000) of implementing the programmes in this chapter to be some $7.1 billion U.S., including $3.5 billion U.S. from the international community on grant or concessional terms. Virtually all of this money would be spent in meeting the needs of the third programme area, which involves the implementation of activities required to reconcile demographic dynamics and sustainability policies.

DISCUSSION OF CHAPTER 5

Based on population projections, ninety percent of the world's population growth over the next 40 years will take place in DCs. However, the much smaller ten percent increase experienced by developed countries will nonetheless have a highly significant environmental impact on the planet. This impact will likely occur because of the high and ever growing rates of per capita consumption of those in the developed countries. Unfortunately, notwithstanding the recommendations in Chapter 4 (**Changing Consumption Patterns**), current trends do not suggest foreseeable changes to these per capita consumption habits and expectations.

The environmental impact of people is not only based on their absolute numbers, but on the prevailing technology and consumption patterns. In the case of most DCs, there may be large populations, but relatively primitive technologies and low consumption. In the case of developed countries, there are relatively low populations, but massive technology and enormous rates of consumption. Per

capita consumption in developed countries grows every year, and in the aggregate, has a much greater impact than does the developing world, even with its large population.

One of Canada's objectives at UNCED was to clearly establish that overpopulation is an environmental issue and that resolution of population problems is a key to sustainable development. This objective appears to have been met in various of the chapter's assertions, such as: "The growth of world population and production combined with unsustainable consumption patterns places increasingly severe stress on the life-supporting capacities of our planet". In addition, the emphasis placed on the importance of the economic status of women in dealing with population programmes and the need to involve men in education programmes was also a Canadian objective which is met in this chapter. However, some mention in this chapter of the prospect of "environmental refugees" seeking access to developed countries, such as Canada, in the 21st century would not have been inappropriate. In view of current population and environmental trends, it would be brash to deny the possibility that Canada may, in coming decades, face great pressure to play a major role in accommodating these refugees. Involvement in planning for this possibility would seem to be an activity in which EAITC may have a particular interest.

For perspective on Canada's role in addressing the population problem, some 17 per cent of CIDA's aid between 1985 and 1990 went to support projects designed to reduce, directly and indirectly, population growth. This represented the Agency's single largest category of environment and development programming. In total CIDA spent $225 million CDN on population, family planning and other demographic projects.

CHAPTER CRITIQUE

The main criticism of this chapter is that what many say is the greatest problem facing humankind is inadequately addressed. This problem is excessive population growth. Population growth estimates were recently revised upwards by the United Nations Fund for Population Activities (UNFPA) from 5.7 billion today to between 8 and 9 billion by 2020 and 11 billion by 2045.

An important distinction which is not explicitly made in this chapter is the differing environmental impacts related to population growth depending on where this growth occurs. For instance, some of the fastest growth (an average of 6% per year, or three times world population growth rates) will occur in cities, such as Mexico City, Shanghai, Cairo and Rio de Janeiro, where infrastructure is already inadequate and where the lives of the majority of their inhabitants are miserable and qualitatively unsustainable.

While this chapter recommends increased research into various aspects of demographic dynamics, it may be argued that research should also be directed at ways to reduce the growth rate of the planet's population. Indeed, terms such as "family planning" and "contraception" do not appear at all in Agenda 21. Despite this weakness, the activities suggested in this chapter are nonetheless necessary to develop appropriate policies which encourage sustainable development. As such, the merit of these activities should not be diminished. What is missing, however, is some resolution on the importance of controlling growth in global population. If global population is indeed a "crisis" as many believe it to be, then it should have been treated as such in Agenda 21. One of Canada's objectives which was not met, for example, was to seek to gain national and international recognition of the importance of reproductive health service availability in DCs.

In part, the lack of attention devoted in Agenda 21 to the population problem may be attributed to the religious and political sensitivities associated with discussion of population growth. Moreover, given that the population problem is expected to be fully addressed at the International Conference on Population and Development to be held in Cairo in 1994, there was an added incentive not to address population issues in great depth at UNCED. (Interestingly, however, little mention of this forthcoming Conference appears in the chapter.) Hence, although serious discussion of the population issue is to be held in abeyance for close to two more years, it is hoped by many countries, including Canada, that work can begin on understanding more about the demographic factors which are associated with population growth and associated environmental stresses. This work will undoubtedly be a useful input to the Conference on Population and Development.

A further criticism of this chapter is that nothing is said about the experiences learned from, or the need to evaluate, previous DC population policies that have been implemented, often with little or no success, over the past decades. As there are certainly lessons to be learned from these past efforts, some reference to them would have been helpful.

In summary, the chapter succeeds in providing a framework for future action to combat the problem of overpopulation. The question is whether governments will demonstrate the political will to commit the necessary resources to deal with the world population crisis before it is too late. Where the chapter appears weak, (largely as a result of pressure from specific interest groups), is in the provision of specific remedies to the problem of overpopulation. However, as Agenda 21 as a whole lacks in specificity on most fronts, this chapter does not appear unduly out of place in this regard.

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CHAPTER 8 - Integrating Environment and Development in Decision Making

This broadly based chapter seeks to highlight the need to fully embody both environmental and developmental concerns in public and private decision-making processes. Decision-making within many countries often tends to separate economic, social and environmental factors. The main message in this chapter is that countries can no longer afford to make decisions without considering environment and development issues concurrently; a fundamental reshaping of the decision-making processes at the policy planning and management levels may therefore be necessary. Essentially, the chapter argues that integrating environmental concerns with other aspects of development policy/planning/management is essential, and doing so requires a strengthening of data/information/systems, methods, institutions and mechanisms at all levels.

This chapter consists of the following programme areas:

1) Integrating environment and development at the policy, planning and management levels;
2) Providing an effective legal and regulatory framework;
3) Making effective use of economic instruments and market and other incentives; and
4) Establishing systems for integrated environmental accounting.

The main feature of each programme area are presented as follows.

Integrating Environment and Development at the Policy, Planning and Management Levels

The message of this programme area is that, in light of country-specific conditions, an adjustment or fundamental reshaping of decision making at all levels may be necessary if environment and development are to be fully integrated. To this end, the overall objective is to "improve or restructure the decision-making process so that consideration of socio-economic and environmental issues is fully integrated and a broader range of public participation assured". The achievement of this objective is to be brought about through several means, including:

-changes to the public policy decision making processes;
-improvements to planning and management systems to support environmentally sustainable decision making;
-developing national indicators of sustainable development; and
-adopting national strategies for sustainable development.

Activities to be encouraged, include:

-researching environment and development interactions;
-enhancing education and training of all who are or may be in positions to integrate environment and development at various

stages of the decision making and implementation process;
-promoting public awareness of the importance of considering environment and development in an integrated manner; and
-strengthening national institutional capacity to integrate social, economic, developmental and environmental issues at all levels of development decision making and implementation.

Providing an Effective Legal and Regulatory Framework

This programme area is premised on the recognition that sound and enforceable laws suited to country-specific conditions are a vitally important means to transform environment and development policies into action. As such, the overall objective is to "promote, in the light of country-specific conditions, the integration of environment and development policies through appropriate legal and regulatory policies, instruments and enforcement mechanisms at the national, state, provincial and local level."
Activities suggested to meet this objective include:
-making and enforcing laws and regulations which are sufficiently effective to meet tenets of sustainable development;
-establishing judicial and administrative procedures which both enable redress and remedy of unlawful actions affecting environment and development and which are accessible to all who have a recognized legal interest;
-providing legal reference and support services to offer public policy makers an integrated information base of environment and development law;
-establishing a cooperative training network for sustainable development law. This could involve having international and academic institutions offering trainees from developing countries programmes opportunities to study of environment and development law;
-developing effective national programmes for reviewing and enforcing compliance with national, state, provincial and local laws on environment and development; and
-implementing national monitoring of legal follow-up to international instruments.

Making Effective Use of Economic Instruments and Market and Other Incentives

As discussed in the **Environment as a Valuable Resource** theme, environmental law and regulation cannot alone be expected to deal with the problems of environment and development. Prices, markets and government fiscal and economic policies also play a complementary role in shaping attitudes and behaviour towards the environment. The polluter-pays principle and the natural-resource-user-pays concept are being explored and experimented with in a number of countries. This programme area has as its objectives both

the incorporation of environmental costs in the decisions of producers and consumers and the reversal of the tendency to treat the environment as a "free good". In addition, the use of market principles wherever appropriate, in the framing of economic policies to pursue sustainable development should be encouraged.

An effort should be made to take account of the particular circumstances of DCs in the development and application of economic instruments and market mechanisms. The exchange of information should, (as is emphasized throughout Agenda 21) be actively encouraged with regard to the use of economic instruments and market mechanisms and to enhancing the understanding of sustainable development economics.

Establishing Systems for Integrated Environmental Accounting

As sustainable development encompasses social, economic and environmental dimensions, it is also important that national accounting procedures not be restricted to measuring only the production of goods and services. A common framework needs to be developed which can integrate environment and social dimensions into the national accounting framework, including at least satellite systems of accounts for natural resources, in all member States. Resulting systems of integrated environmental and economic accounting (IAEA) to be established in all member States should be seen as a complement to, rather than a substitute for, traditional national accounting practices. It is the intention that IAEAs would play an integral part in the national development decision-making process. In addition, the definition of "economically active" could be expanded to include people performing productive but unpaid tasks; this would enable their contribution to be adequately measured and taken into account in decision-making.

Towards establishing uniformity, it is suggested that the Statistical Office of the UN Secretariat make available to all member States the SNA Handbook on Integrated Environmental and Economic Accounting. Governments are encouraged both to identify measures which correct price distortions arising from environmental programmes affecting land, water, energy and other natural resources and to encourage corporations to develop and implement rules for accounting for sustainable development.

The annual cost (1993-2000) of implementing the proposals in these programme areas is estimated at $70 million U.S.

DISCUSSION OF CHAPTER 8

Canada has undertaken a number of initiatives toward integrating environment and development into public policy decision-making processes. Round Tables on the Environment and Economy have been

set up by the federal government and by the ten provinces and two territories to facilitate cooperation among business, government, environmental organizations, and community groups. Canada has become a leader in resource accounting, state of the environment reporting, program and policy impact assessments, and the integration of the environment and the economy in policy development.

With respect to the fourth programme area, Canada is among the countries already involved in developing its own Integrated Environmental and Economic Accounting process. As discussed in Section I, this work involves enhancing the role of the System of National Accounts to include a physical inventory of the stocks and flows of several natural resources. Canada's work in this regard is very much in line with what is called for in this chapter and, in terms of capacity building, may be applicable to other countries who need assistance in developing their own system of IAEA.

Canada supported actions proposed in this chapter that dealt with the dissemination of public information and access to information in the public domain. Also, the Canadian delegation sought to avoid questions that related to private or protected scientific or economic data or environmental technology.

Interestingly, there were two additional programme areas which were proposed, but deleted before UNCED on the grounds that they would be dealt with in post-Rio activities. These areas were: Full Cost Environmental Accounting and Global Corporate Environmental Management.

CHAPTER CRITIQUE

There is little argument that the development of effective conceptual frameworks and methods for integrating environmental costs and inputs into private and public decision-making is crucial to achieving sustainable development. This chapter, however, conveys this message rather sporadically, rather than in the cohesive and straight forward manner one might expect. There appears, moreover, to be a lack of clarity both about why environmental concerns are not already adequately integrated into decision making processes and how they could be. Were this clarification to have been made, the chapter would be stronger.

The importance attached in this chapter to developing and applying economic instruments and environmental accounting practices to deal with environmental problems, is very much in line with the emphasis Agenda 21 places on market-based solutions to promote sustainable development. Much of what appears in Theme 3 (**Environment as a Valuable Resource**) surfaces in this chapter. For example, a strong emphasis is placed on furthering the use of pricing, economic instruments, and accounting policies to more accurately integrate

sustainability practices into economic management. Missing, however, is mention of the importance of applying economic instruments in an equitable manner; it is not difficult to see how the merits of using economic instruments to move toward full cost pricing of environmental resources could be undermined without addressing matters of equity. For example, the application of economic instruments could be regressive if it means costs are applied without discrimination as to who bears them. Without this discrimination, these costs could be imposed on those in society who are least able to afford them.

While the objective of developing systems of integrated environmental and economic accounting at the national and institutional levels is given due consideration in this chapter, nothing is said about micro-level applications. Specifically, the necessity of developing environmental accounting practices at the industry and business entity levels may have warranted mention. This is particularly so in view of Agenda 21's reliance upon private sector initiatives to push sustainable development to fruition, largely on the basis of market-based information relating to environmental costs and inputs.

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CHAPTER 10 - Integrated Approach to the Planning and Management of Land Resources

Since land resources are used for a variety of purposes, it is desirable to plan and manage all uses in an integrated and sustainable manner; this is the main message of the chapter. As such, the broad objective is to encourage allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to integrated and environmentally sustainable land resource management. The chapter specifies several dates between 1996 and 2000 during which objectives relating to the sustainable management of land resources should be in place. It is stressed early in the chapter that operational aspects of planning and management are not dealt with in this chapter but are left to other chapters dealing with relevant sectoral areas (e.g., forests, desertification, biological diversity, etc.).

Activities for governments to follow to meet the needs of integrated planning and management of land resources include:
-developing supportive policies and policy instruments to promote the best possible land use and sustainable management of land resources;
-strengthening the planning and management systems and planning frameworks, at various government levels, to facilitate an integrated approach;
-promoting public awareness of the importance of integrated land and land resources management;
-promoting public participation in the decision-making and implementation processes;
-strengthen the information systems necessary for making decisions and evaluating future changes on land use and management;
-strengthen regional and international coordination and cooperation in the exchange of information on land and land resources management;
-promoting the human resources development necessary to plan and manage land and land resources sustainably;
-strengthening the technological capacities to support the various aspects of the sustainable planning and management process at different levels of government.

An estimated $50 million U.S. per year from international sources on grant or concessional terms will be needed during 1993-2000 to implement the programme proposed in this chapter.

DISCUSSION OF CHAPTER 10

This chapter appears to be mainly aimed at DCs which have not undertaken formal and systematic steps toward planning and practising sustainable land and land resource management. Having stated this, there are also a number of lessons for Canada (and

other developed countries) found in this chapter and which should be followed if increasing demands for sustainable land use management are to be met. For example, loss of arable land in Canada is by no means a trivial matter; in the 20 years between 1966 and 1986, urbanization claimed more than 300,000 hectares of Canada's rural land, 58% of which were agricultural lands. Another example relates to the Canadian forestry sector which is discovering that interests external to the forest ~~industry~~ now have a major bearing on how timber lands will ultimately be managed in the public interest. If these "multi-stakeholder interests are to be integrated with forest industry interests, many of the chapter's recommended activities will have to be followed.

CHAPTER CRITIQUE

This chapter is very closely related to Chapters 8 (**Integrating Environment and Development in Decision-Making**), 37 (**National Mechanisms and International Cooperation for Capacity Building in Developing Countries**) and 38 (**International Institutional Arrangements**). The messages in this chapter could, in fact, have been incorporated into the other chapters, particularly Chapter 8. An integrated approach to resource use and management (not just **land** resources, but all natural resources) could have been included as part of the discussion relating to policy-making for sustainable development initiatives. As it stands, therefore, this chapter could be criticized as being unnecessarily curtailed in scope by referring only to land resources and by excluding operational aspects of land resource planning and management.

Although non-governmental organizations (NGOs) are mentioned as collaborators in carrying out the recommendations of this chapter, this chapter may be criticized for underemphasizing their role. For example, it is proposed that **governments** launch awareness-raising campaigns to alert and educate people on integrated land management issues and the role that individuals and social groups can play in it. The awareness-building function of NGOs, however, is not mentioned.

The role of research in meeting the objectives of this chapter is emphasized, but the research topics mentioned relate only to **what** is to be managed (e.g., land capability, ecosystem functions and interactions between land resources and social, economic and environmental systems). Nothing is explicitly said about research on the integrated land management system, structure and process itself.

ECONOMIC IMPLICATIONS

This chapter appears to offer opportunities for the Canadian service sector, particularly regarding the transfer of training

skills on land management techniques. In addition, there will be an impact on Canadian agriculture in terms of the DC demand for its know-how related to integrated planning and management of land.

As the proposed activities would affect the manner in which land is used, there could be impacts on:

- the **forestry sector** as the demand for alternative/multiple use of land resources increases;

- the **mining industry**, as increased protection of lands may decrease land accessibility for exploration; and

- **agriculture** as a result of constraints imposed on expansion of the land under cultivation.

It should be noted that because most land-use planning activities fall within provincial and municipal jurisdictions, at the federal level Canada is unable to implement land planning and management policies as broad in scope as is recommended in Agenda 21.

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CHAPTER 11 - Combatting Deforestation

This chapter contains the following programme areas:

1) Sustaining the multiple roles and functions of all types of forests, forest lands and woodlands;
2) Enhancing the protection, sustainable management and conservation of all forests, and the greening of degraded areas,through forest rehabilitation, afforestation, reforestation and other rehabilitative means;
3) Promoting efficient utilization and assessment to recover the full valuation of the goods and services provided by forests, forest lands and woodlands; and
4) Establishing and/or strengthening capacities for the planning, assessment and systematic observations of forests and related programmes, projects and activities, including commercial trade and processes.

Each of these programme areas is summarized as follows.

Sustaining the Multiple Roles and Functions of All Types of Forests, Forest Lands and Woodlands

This programme area is based on the widely recognized need to strengthen the "policies, methods and mechanisms adopted to support and develop the multiple ecological, economic, social and cultural roles of trees, forests and forest lands". The objectives of this programme area are, therefore, directed at enhancing the economic and environmental sustainability of forest management practices, including incorporating the needs of various forest stakeholders (e.g., logging companies, indigenous people, rural cooperatives, local communities, women and youth).

It is recommended that governments, with the support of pertinent regional, subregional and international organizations, undertake plans and programmes directed at enhancing the educational, research, institutional and administrative capabilities needed for multi-stakeholder forest management.

Enhancing the Protection, Sustainable Management and Conservation of All Forests, and the Greening of Degraded Areas, Through Forest Rehabilitation, Afforestation, Reforestation and Other Rehabilitative Means

There are numerous economic and environmental pressures on the world's forests which need immediate attention. The impacts of loss and degradation of forests are in the form of soil erosion; loss of biological diversity, damage to wildlife habitats and degradation of watershed area, deterioration of the quality of life and

reduction of development options. The objectives of this programme area are aimed at preparing and implementing national forestry plans for the management, conservation and sustainable development of forests; these objectives are to be achieved through "greening activities" mainly concerned with the promotion of planting activities. Recommended activities are intended, in short, to promote that which is found in this programme area's title. These activities are to be carried out by governments with the participation of forest stakeholders, and with cooperation from the international community by way of information sharing and the establishment of international agreements relating to forestry.

Promoting Efficient Utilization and Assessment to Recover the Full Valuation of the Goods and Services Provided by Forests, Forest Lands and Woodlands

The vast potential of forests and forest lands as a major resource for development is not yet fully realized. In addition to wood fibre, eco-tourism and the managed supply of genetic materials are examples of areas which have only recently been explored for their economic potential. Forest resources, being renewable, can be sustainably managed in perpetuity and efforts must be undertaken to ensure such management becomes a reality. To this end, efforts must be taken to incorporate the social, economic and ecological value of forests into the national economic accounting systems.

Proposed activities are directed at formulating and implementing scientifically sound criteria for the management, conservation and sustainable development of forests. Attention should be directed at increasing the economic contribution of forests while both maintaining forests' ecological integrity and respecting the needs of forest stakeholders. The application of science and technology to achieve this objective is, not surprisingly, considered central to this process.

Establishing and/or Strengthening Capacities for the Planning, Assessment and Systematic Observations of Forests and Related Programmes, Projects and Activities, Including Commercial Trade and Processes

There is a need to strengthen or establish systems which monitor forests with a view to assessing the impacts of various forest use and to provide economists and planners with sound information on the status of forest resources. Recommended activities are aimed at the development of systems which capture forest resource data and which encourage information sharing regionally, nationally and internationally. The development of data systems, the use of remote sensing surveys and statistical modelling and the establishment of measurement standards relating to forest resources are examples of these activities.

The estimated annual cost (1993-2000) of implementing the programme areas in this chapter is about $32 billion U.S., including about $6 billion U.S. from the international community on grant or concessional terms.

CHAPTER CRITIQUE

It is apparent that this chapter is not so much about "combating deforestation" as it is about the economic and environmentally sustainable use of the world's remaining forests. It should be noted that many of the recommended activities (e.g., village woodlots, government plantations, fuelwood efficiency initiatives) have already been tried and tested and have in many cases proven largely ineffective in reducing tropical forest loss. It has been shown, for example, (at least in Africa) that government-run plantations are neither economically nor environmentally viable. In some instances government plantations removed forest cover to plant high-value species, thereby denying the poor access to produce (fuelwood, food, fodder) which they consider important. Conversely, one of the ways which has been identified as useful in increasing tree cover is through farmer/landowner planting (i.e., agroforestry - the introduction of trees on farms). Agroforestry is not, however, mentioned is this chapter as a means to combat deforestation. The chapter is, however, successful in conveying the importance of including the needs of all forest stakeholders in development and implementation of forest use policies and programmes. Clearly however, bridging the gap between numerous stakeholder needs and increasing economic demands on the forests will be a challenge of the highest order, even for relatively stable political and economic regimes, such as Canada's. The difficulties in meeting this challenge and the remedies which will be required are not mentioned in this chapter.

The most striking weakness of this chapter is the lack of mention of the ultimate causes of deforestation (i.e., poverty and landlessness in DCs and excessive consumerism for forest products by developed countries). This omission weakens the chapter considerably and reduces any sense of urgency to address the deforestation problem. While systemic problems, such as poverty and consumerism, are addressed separately in other chapters, (inadequately many have argued) they are also relevant to this chapter and should have been recognized as such.

Linkages to related environmental problems and issues, such as deforestation, biodiversity, land use activities and water resources are cursory if they are mentioned at all. For example, the significance of tropical forests for biological diversity is only alluded to in terms of an economic resource worthy of further exploitation. The fact that tropical forests, covering only 10 per cent of the earth's land area, contain more than half the world's rapidly diminishing number of terrestrial species deserves specific

mention in a chapter dealing with deforestation.

ECONOMIC IMPLICATIONS

Forestry is vital to the Canadian economy and the export value of its forest products is higher than that of any other country. In 1991, the industry contributed about $17.5 billion CDN to Canada's balance of trade and accounted for 1 out of every 15 jobs. Thus, in view of the economic importance of forests to Canada, this chapter is of particular relevance to this report. Although, the chapter - like most Agenda 21 chapters - is directed primarily at the needs of DCs, there are numerous recommended activities which Canada needs to direct towards its own forest management programmes and practices. Although generally further ahead in the use of effective forest management than the majority of countries to which this chapter applies, Canada has well known problems of its own. The subject of clearcutting, particularly in British Columbia, and the use of chlorine bleaching processes are two of the more current and contentious issues facing forest management in Canada and, commensurately, Canada's forest product export potential. As such, DCs are less likely to accept demands relating to their forests from developed countries like Canada if the latter have not themselves adopted sound forest management practices, such as comprehensive restoration and replanting of once forested sites.

While primarily a provincial responsibility, the forest industry is highly dependent on exports; this fact makes it a matter of federal concern and one deserving of continuing attention. Part of this attention has been directed at the International Model Forest Programme launched at UNCED by Canada. The first stage of the programme is the establishment of "model forests"(*) in three countries, based on the concept of Canada's Model Forest Programme now being implemented.

The International Model Forest Programme supports key Canadian foreign policy objectives. On overall international environment policy, it fulfils a number of Agenda 21 recommendations, including the provision of new and additional resources to DCs and promoting the transfer of technology. On forests, the programme will address a fundamental obstacle to progress towards a Global Forests Convention, which is the absence of a clearly understood definition of sustainable forest management. The programme does not promote any one definition. Rather, it proposes criteria such as multiple forest values (i.e., not just timber but also wildlife habitat, leisure, etc.), cooperative management involving all relevant groups (i.e., industry, NGOs, community and indigenous groups) and the need to develop local solutions. The objective is for nations to arrive together at a better understanding of sustainable forest management through international cooperation in building sites along these lines and maintaining a network among them.

Potential impacts on the following industry sectors resulting from the initiatives of this chapter and the Forestry Principles have been identified:

Mining: Accessibility of land for exploration is one of the key determinants of the health of the metals and minerals sector. Encouragement of multiple use of forests could increase land accessible for mining purposes. Conversely, however, moves toward increased protection and reforestation may also decrease land accessible for mineral exploration.

Forestry: The proposals in this chapter directed at deforestation issues will have a clear impact on forest industries - which employ more people than any other natural resource based industry in Canada. Increased amounts of land set aside as protected areas would, for example, have some impact on harvesting activities. Harvesting techniques, especially clearcutting, have become increasingly mechanized, but Canadian forest management practices have recently come under domestic and international criticism. The problem with clearcutting is that if it is not done properly, it can lead to serious erosion and land slides. It should be noted, however, that clearcutting is generally considered to be an environmentally sound harvesting technique in certain areas, while it should be avoided altogether in others (e.g., steep slopes).

While there are clear benefits for sustainable development objectives in moving toward full cost pricing of forest products, there is also the possibility of resulting market distortions and trade barriers. The probability of this eventuality is heightened if Canada's competitors do not adopt similar pricing practices for their forestry products.

Machinery and Equipment: Modifications of forest harvesting methods would have an impact on machinery and equipment needed to carry out these activities.

Service Industry: There are opportunities for Canada to provide forest management, science and technology expertise to DCs. The Model Forest Programme is a sample of Canadian assistance abroad in this respect, and should be indicative of the potential for further opportunities for the service sector as applies to the forestry industry.

* A model forest is a working forest managed on sound environmental principles by a partnership of a combination of government, industry, NGOs, indigenous and community groups. The forest may be used for a variety of purposes including timber exploitation, conservation, wildlife habitat and eco-tourism. Ten sites have been identified in Canada as part of the Green Plan, and Green Plan International funding will support the three international sites.

Discussions are in progress with Mexico and Russia to be the first international sites. A third site has not yet been identified. A network connecting the eventual thirteen sites will be a channel to share information, experience and technology. Over time, it is intended that the network be expanded to include other countries.

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CHAPTER 14 - Promoting Sustainable Agriculture and Rural Development

This is a relatively lengthy and comprehensive chapter which includes twelve programme areas aimed at promoting sustainable agriculture and rural development (SARD). The chapter's overall objective is to encourage adjustments to agricultural, environmental and macroeconomic national and international policies to meet the increasing demands for food and other agricultural commodities. The stark reality is that in three decades the expected global population will be 8.5 billion with some 83% living in DCs. Priority must, therefore, be given to maintaining and improving the capacity of the world's higher potential agricultural lands to support an expanding population in an environmentally sustainable manner. Concurrently, conserving and rehabilitating the natural resources on lower potential lands is also necessary to maintain sustainable human/land ratios.

The jist of this chapter can best be identified by listing the various programme areas which are presented. These programme areas are:

(1) agricultural policy review, planning and integrated programming in the light of the multifunctional aspect of agriculture, particularly with regard to food security and sustainable development;

(2) ensuring people's participation and promoting human resource development for sustainable agriculture;

(3) improving farm production and farming systems through diversification of farm and non-farm employment and infrastructure development;

(4) land resource planning information and education for agriculture;

(5) land conservation and rehabilitation;

(6) water for sustainable food production and sustainable rural development;

(7) conservation and sustainable utilization of plant genetic resources for food and sustainable agriculture;

(8) conservation and sustainable utilization of animal genetic resources for sustainable agriculture;

(9) integrated pest management and control in agriculture;

(10) sustainable plant nutrition to increase food production;

(11) rural energy transition to enhance productivity; and

(12) evaluation of the effects of ultraviolet radiation on plants and animals caused by the depletion of the stratospheric ozone layer.

A number of recommended activities are offered which promote the meeting of the objectives contained in the above programmes.

The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of the above programmes to be about $31.8 billion U.S. per year (not including Programme area 6 - water for sustainable food production and sustainable rural development) including $5.1 billion U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 14

As can be seen from the list of programme areas, the thrust of this chapter is to encourage national and international policy frameworks for SARD, in both developed and developing countries. In promoting SARD, a heavy emphasis is placed on the importance of effective integration of agricultural and environmental policies, agricultural research, human resource development and capacity building. As a result, the need for international cooperation and coordination is clearly paramount if the objectives of this chapter are to be achieved.

Many of the objectives and activities appearing in this chapter either appear elsewhere in Agenda 21 or are contingent upon the completion of activities recommended in other chapters. For example, this chapter should not be read in isolation of Chapter 10 (**Integrated Approach to the Planning and Management of Land Resources**); it is clear that enabling sustainable agriculture and rural development is only possible once the integrated use of the land and its resources has been established.

Beyond being identified, programme area (6) is not addressed at all in this chapter, but is included in chapter 18 (**Protection of the Quality and Supply of Freshwater Resources**). Similarly, the need to protect animal and plant genetic resources (Programme Areas 7 and 8) is also reflected in much more detail in the Convention on Biodiversity (and in Chapter 15 - **Conservation of Biological Diversity**).

In addition, there are issues discussed in this chapter which are presented in Chapter 3 (**Combatting Poverty**), Chapter 8, (**Integrating Environment and Development in Decision Making**), and in Chapter 37, (**National Mechanisms and International Cooperation**

for Capacity Building in Developing Countries).

It seems, therefore, that in following the recommended activities of this chapter, much of what is recommended elsewhere in Agenda 21 would be achieved either directly or indirectly.

CHAPTER CRITIQUE

With respect to weaknesses in the chapter, there is a lack of a sound conceptual framework to link sustainable agriculture to rural development. There is not, moreover, a clear definition as to what "sustainable agriculture" or "rural development" actually are. It should not have been assumed that the nature of these concepts would be self-evident to readers.

There is a strong emphasis in the chapter on the need to develop alternative policy plans and programmes in promoting sustainable agriculture and rural development. There is not, however, any discussion on how these plans and programmes should be implemented; the roles of institutions, bureaucratic structures, and linkages between governments and NGOs for example, are not dealt with. Other chapters (e.g., Chapter 39, **International Legal Instruments and Mechanisms**), Chapter 35, **Science for Sustainable Development**) and Chapter 38 (**International Institutional Arrangements**) should, consequently, be read in conjunction with this one to cover issues surrounding implementation.

ECONOMIC IMPLICATIONS

While the chapter appears to be directed mainly at DCs, there is concern that even the developed countries cannot sustain their agricultural practices much longer, dependent as they are often on intensive and environmentally unsustainable use of synthetic fertilizers, and pesticides. Soil and fertility loss, erosion, degradation and depletion of lands are a serious, although often understated problem; the organic content of the Prairie soils, for instance, has declined by some 40-50% over the past 30 years. The possible economic implications for Canada's agriculture sector of losses in organic content of this magnitude are self-evident.

Canada is working towards its own adoption of sustainable agriculture and rural development policies and initiatives through its National Soil Conservation Program (NSCP). This program was set up by the Federal Government in 1987. The money allocated to the Program will be distributed by the Federal Government according to the specific needs of each province. This money will encourage farmers to use soil conservation strategies, and will support demonstrations, research, monitoring and public awareness. Canada's Green Plan is supposed to expand on NSCP activities by including such issues as water quality, wildlife habitat enhancement, and

agricultural waste management.

A contentious issue in the development of this chapter was the relationship between agriculture, trade and the environment. During negotiations, Canada emphasized the need to address the trade and agricultural policies and practices of multinational corporations. Canada also tried to ensure consistency between its approach to Chapter 16 (**Environmentally Sound Management of Biotechnology**) and the broader implications of biotechnology for sustainable agriculture. Canada promoted the concept that sustainable agriculture involves not only increased productivity but also food security and availability, and local self-sufficiency. Canada supported the use of alternative fuels over expanded fossil fuel use and stronger international standards for pesticide use. Most of Canada's objectives were met in the final document, with the exception of strengthened international standards for pesticides. Instead, this chapter calls for the implementation of the International Code of Conduct on the Distribution and Use of Pesticides.

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CHAPTER 15 - Conservation of Biological Diversity

The principal purpose of this chapter is to document general international agreement on the importance of biodiversity and to support the stronger Convention on Biological Diversity. Emphasis is on the economic utility of biodiversity. Human actions (habitat destruction, over-harvesting, pollution and the introduction of weed and pest species) are recognized as the main causes of loss of biodiversity.

The chapter is based on the recognition that our planet's essential goods and services depend on preserving the variety and variability of genes, species, populations and ecosystems. The current decline in plant and animal biodiversity represents a serious threat to the sustainable management and use of biological resources. More to the point, the prospects of achieving sustainable development on a global basis are significantly correlated with the planet's extent of biological diversity.

Note that, as with many chapters in Agenda 21, the objectives and recommended activities in this chapter cannot be read in isolation of other chapters. End of the chapter notes provide references to other Agenda 21 chapters which should be read for elaboration of ideas which are only briefly touched on in this chapter.

The biotechnology industry is presently in the midst of revolutionary discoveries, with the prospect of many further valuable applications, particularly in the agricultural and health sectors. While nations have the sovereign right to exploit their own biological resources pursuant to their environmental policies, it is stressed that they also have a responsibility to conserve their biodiversity and to avoid damage to the biodiversity of other nations.

The chapter's objectives are directed at developing national and international strategies for the conservation of biological diversity. The roles of indigenous people, international cooperation and women are encouraged throughout this chapter. Also encouraged is the equitable sharing of the benefits of biotechnological development with countries from which genetic resources used in the biotechnology industry often originate. This point has proven particularly contentious as it introduces the matter of intellectual property rights relating to the commercial use of genetic resources. While more is said of this subject in the review of Chapter 16 (**Environmentally Sound Management of Technology**), it should be noted that a Canadian objective during the PrepComs was to minimize linkages between "biotechnology" and "biodiversity" beyond those biotechnologies directly related to conservation of biological resources. This objective was met and that is why there are two chapters which may at first blush appear to deal with a similar subject.

To achieve the objectives relating to the conservation of biological diversity, the chapter recommends the promotion and strengthening of international cooperation in:

-scientific and technical work in the field of conservation of biological diversity and the sustainable use of biological and genetic resources;
-data collection relating to biological diversity;
-coordinating implementation of conventions and action plans relating to biological diversity; and
-facilitating the transfer of technologies among States which are relevant to the conservation of biological diversity.

The estimated annual cost of conserving biodiversity during the period (1993-2000) is $3.5 billion U.S. Half of this amount will have to come from international sources on grant or concessional terms.

DISCUSSION OF CHAPTER 15

The conservation of biological diversity is of concern to developed and developing countries alike. Developed countries are primarily concerned about the current rate of loss of biodiversity, much of which is occurring in DCs. At present, only about 1.7 million species of flora and fauna have been identified, yet it is thought there may be anywhere from 10 million to 100 million species of life on earth. Biological diversity remains vast, but an estimated average of three species are eradicated each day. Much of this loss is occurring through tropical rainforest destruction - (tropical forests cover only 7% of the earth's surface but are believed to be the home to at least 50% of the earth's species).

With respect to Canadian initiatives relating to this chapter, in November 1992 the Tri-Council meeting, made up of Canada's Federal, Provincial and Territorial Governments, adopted a follow-up plan to the Biodiversity Convention. The meeting resulted in a Statement of Commitment calling on provinces, territories and the federal government to complete, among other things, the national parks system by the year 2000 as outlined in the Green Plan. The Tri-Council meeting also agreed to a process for completing a National Biodiversity Strategy in two years. As well, in November 1991, the Green Plan introduced a National Wildlife Strategy designed to maintain and enhance the health and diversity of Canadian wildlife.

Canada has participated in a number of international agreements relating to biodiversity. These include: the 1972 Convention on the Protection of the World Cultural and Natural Heritage (The World Heritage Convention); the UNESCO Man and the Biosphere Program; the 1971 Convention on the Conservation of Wetlands of International Importance, drafted in Ramsar, Iran, in 1971; and the International Tropical Timber Agreement reached in Geneva in 1983. It also actively participates in both the Tropical Timber Agreement reached

in Geneva in 1983 and in the Tropical Forest Action Program and the International Tropical Timber Organization located in Japan and which became operational in 1987. Canada is also a signatory to the 1946 International Convention for the Regulation of Whaling; the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which is designated to control trade in about 48,000 listed plants and animals and their derived products; and to the 1979 Convention on the Conservation of Migratory Species of Wild Animals. Since 1980 international and UN efforts have been guided by the principles contained in such key documents as the World Conservation Strategy (1980) and the World Charter for Nature (1982).

CHAPTER CRITIQUE

The chapter may be criticized for focusing mainly on the utility value of biodiversity; the provision of goods and services for human benefit which depend on the variety and variability of living things. There is little recognition of the intrinsic non-utilitarian value of biodiversity as an end unto itself. More tangibly, the value of biodiversity in such ecological functions as nutrient recycling, support of the food chain, fixation of solar energy, protection of soils and breakdown of pollutants - all vital to the planet's well-being - receive no specific attention in this chapter.

It should be noted, however, that during negotiations, Canada undertook to ensure that biodiversity was recognized both as a resource to humans, and as a necessity for the Earth's survival. Canada sought to promote an ecosystem oriented approach throughout the text and helped ensure the chapter was consistent with the Bidiversity Convention.

ECONOMIC IMPLICATIONS

From a purely commercial standpoint, preserving biodiversity has direct benefits for those Canadian industries which depend on biological resources, such as agriculture, pharmaceuticals, forestry, biotechnology and aquaculture. From the DC perspective, the most pressing financial issue relating to biodiversity is that compensation be provided in return for the preservation of biological resources. This compensation may involve financially assisting DCs to gain access to intellectual property rights on biotechnology owned by firms in developed countries.

An important point which needs to be noted is that this chapter is not only aimed at conserving biodiversity, but where applicable, rehabilitating and restoring biodiversity and damaged ecosystems. Such remediation costs can be notoriously expensive relative to the costs incurred in avoiding damage in the first place. As such,

measures aimed at conserving biodiversity may be regarded as relatively low insurance costs against future cleanup or restoration costs. From the Canadian point of view, this factor is significant. While conserving biodiversity in Canada will be expensive, if the activities recommended in this chapter are followed, **restoring** biodiversity and **rehabilitating** damaged ecosystems will be much more expensive. Fortunately, Canada's environmental technology industry has developed expertise in site assessment and restoration practices. As this expertise is an exportable service, it offers Canada the opportunity to sell her knowledge abroad and to play a role in Agenda 21's emphasis on capacity building. Moreover, as international cooperation, information management and capacity building are emphasized in this chapter, Canada's potential role as a leader in designing and implementing measures to establish acceptable levels of biodiversity should not be discounted.

The following sectoral impacts in Canada of the proposals found in this chapter are apparent:

Mining: Activities promoting biodiversity which restrict access to land could affect this sector. Reduced areas for exploration could result in fewer deposits found and, eventually, reduce Canadian mineral production.

Forestry: The effects of conserving biodiversity on the forestry sector relate to harvesting activities. Harvesting trees through clearcutting or whole tree logging methods could cause habitat loss for certain plant and animal species and, eventually, loss of soil fertility. An increase in protected areas could limit harvesting activities and changes in harvesting practices (e.g., more emphasis on selective logging), could reduce production and drive up costs.

Reforestation practices following clearcutting often encourage monoculture, thus reducing the tree species mix. These practices may be seen by forestry companies as the most economically efficient; the proposed activities of this chapter, however, may reduce this efficiency as more plant diversity is encouraged.

Transportation: Possible impacts on the transportation sector would come from disruptions of physical infrastructure, such as roads and pipelines. This infrastructure could, for example, be subject to additional monitoring or regulations to better conserve and manage geographically adjacent levels of biodiversity. Because of the large number of sensitive ecosystems in the northern areas of the country, transportation development initiatives could be impeded perhaps moreso than in the southern parts of the country.

Energy: Flooding large tracts of land for hydroelectric power development causes loss of wildlife habitat. The establishment of protected areas and reserves to protect biodiversity may contribute to restrictions on further hydroelectric expansion (although

Canada's hydroelectric potential has been largely exploited with a few notable exceptions, such as James Bay and Northern Manitoba).

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Chapter 16 - Environmentally Sound Management of Biotechnology

Biotechnology is a rapidly evolving field involving a set of enabling techniques for bringing about specific man-made changes in deoxyribonucleic acid (DNA) in plants, animals and microbial systems. Not only does biotechnology offer numerous possible applications in fields from health care to forestry, but it also promises new opportunities in global partnerships with respect to biotechnology research and development. These partnerships may be particularly fruitful between those countries rich in biological resources, such as rainforest ecosystems, but which lack the expertise and capital needed to apply such resources through biotechnology and the countries, such as Canada, which have been developing this expertise. From the perspective of Agenda 21, the overriding objective of biotechnology is to transform biological resources so that they serve the needs of sustainable development.

This chapter sets out five programme areas directed at promoting the development, management and internationally accepted application of biotechnology. These areas are:

(1) Increasing the availability of food, feed and renewable raw materials;
(2) Improving human health;
(3) Enhancing protection of the environment;
(4) Enhancing safety and developing international mechanisms for cooperation;
(5) Establishing enabling mechanisms for the development and the environmentally sound application of biotechnology.

Each of these areas are overviewed as follows:

Increasing the availability of food, feed and renewable raw materials

Biotechnology is expected to play an increasingly important role in enabling the planet's agricultural systems to feed the growing global population. It is the objective of this programme area to encourage the application of biotechnology in increasing both the quantity and quality of foodstuffs, particularly for the benefit of DCs in which population will continue to grow most rapidly.

Recommended activities are aimed at: enhancing agricultural output through promoting and developing biotechnology applications which improve plant productivity; encouraging pest and disease resistance; facilitating safe and reliable practices in the use of biotechnology; and identifying plant varieties which promote sustainable agriculture.

Activities are also proposed which encourage effective information

and technology sharing. Collaborative research programmes, especially in developing countries, acceleration of technology acquisition, exchange of knowledge on traditional biotechnologies and training of professionals to work in the biotechnology industry represent the type of activities recommended in this programme area.

Improving human health

In recognition of the need for adequate human health as an essential component of development, the objective of this programme area is to apply biotechnology to a global health programme. Specifically, it is intended that the role of biotechnology in combatting diseases and promoting human health should be enhanced, through such means as development of better drugs combined with equitable access to these drugs, and the development of programmes to assist in specific treatment of and protection from communicable and non-communicable diseases.

Activities in support of this programme area's objective are aimed at developing, improving and using the tools of biotechnology to promote human health. Consideration should be given to the ethical, proprietary and safety questions which surround the field of biotechnology in the context of health protection.

Enhancing protection of the environment

As discussed in the overview of Chapter 15, to encourage ecosystem biodiversity, the need for a diverse genetic pool of plant, animal and microbial germ plasm for sustainable development is well established. Biotechnology is one of many tools that can play an important role in supporting this gene pool through the rehabilitation of degraded ecosystems and landscapes. The objective of this programme area is "to prevent, halt and reverse environmental degradation through the appropriate use of biotechnology in conjunction with other technologies, while supporting safety procedures as an integral component of the programme".

Activities are mainly aimed at developing and promoting processes which reduce inputs to production and reduce outputs to the environment (i.e., waste). Biotechnology is regarded as a complementary means to accomplish this objective, in conjunction with various other technologies and processes.

Enhancing safety and developing international mechanisms for cooperation

There is a need for further development of internationally agreed

principles on risk assessment and management of all aspects of biotechnology, which should build upon those developed at the national level. It is, consequently, the objective of this programme area to "ensure safety in biotechnology development, application, exchange and transfer through international agreement on principles to be applied on risk assessment and management, with particular reference to health and environmental considerations, including the widest public participation and taking account of ethical considerations".

Activities in this programme area call for close international cooperation, particularly regarding the universal availability and exchange of information relating to safety procedures and the development of internationally agreed principles on these procedures.

Establishing enabling mechanisms for the development and the environmentally sound application of biotechnology

The accelerated development and application of biotechnologies, particularly in DCs, will require a major effort to build up institutional capacities at national and regional levels. Enabling factors, such as training capacity, research and development facilities, funding mechanisms, protection of intellectual property rights, marketing skills and biotechnology safety assessment procedures must be developed before the benefits of the biotechnology industry can be fully realized by developing countries. There is, therefore, a need for international initiatives to support efforts into the development and application of biotechnologies to serve the needs of sustainable development.

The objectives of this programme area are:
(1) to promote the development and application of biotechnologies, with special emphasis on DCs;
(2) to identify means to enhance current efforts to determine the needs for additional initiatives, particularly in respect of DCs, and to develop appropriate response strategies, including proposals for any new international mechanisms; and
(3) to establish appropriate mechanisms for safety appraisal and risk assessment at the local, regional and international levels and to be cognizant of the social and cultural impacts of the development and application of biotechnology.

Recommended activities are aimed at undertaking reviews of existing enabling mechanisms and developing strategies which will lead to the institutional capacity to meet the above objectives.

Annual costs for managing and enhancing biotechnology from 1993 to 2000 are estimated at $20 billion U.S., with $197 million U.S. coming from international funding sources on grant or concessional terms.

DISCUSSION OF CHAPTER 16

Opportunities exist to develop enabling mechanisms for the environmentally sound application of biotechnology and, as such, to increase plant and animal productivity, to promote improved human health and to encourage environmental protection. Opportunities also exist to sell Canadian biotech products and biotechnologies to DCs and to develop joint ventures with firms in those countries.

Overall, because of its imprecise wording, the chapter imposes few obligations on Canada; little additional work is required by Canada's efforts in biotechnology to meet the recommendations found within the chapter. There is, however, little doubt that considerable opportunity exists for Canada to play a major role in the further development and application of biotechnologies. Canada's biotechnology industry has revenues in the order of $750-1000 million CDN - 65% of which are from exports. Moreover, the industry, which consists of 250-300 companies, is growing at about 10% per year and, according to a study by Ernst & Young, sales are projected to increase at about 50% per year in the next few years. The reason for this remarkable increase is that many of the firms are currently moving out of the research and development stage of operations and into commercial production. Global partnerships with both developed and developing countries are, as noted in the chapter, clearly worth pursuing with the prospect of both economic and environmental benefits.

This chapter is complementary to a number of others in Agenda 21, particularly Chapter 15 (**Conservation of Biological Diversity**). Clearly, therefore, the field of biotechnology cannot be developed and applied in isolation of the other sectors addressed in Agenda 21. While Agenda 21 correctly emphasizes the need for international and intergovernmental coordination of activities promoting sustainable development, the need for **intersectoral** coordination is not as explicitly recognized. There is a need for an overseeing role to enable the various sectors to proceed in tandem toward sustainable development. Who or what institution(s) will play this overseeing role is still very much uncertain. More will be said of this important issue in the review of Chapter 37 (**National Mechanisms and International Cooperation for Capacity-Building**)

The goal of greatly increasing the availability of food in DCs may have major implications for international trade relations, as well as put increased pressure on agricultural lands. Involvement by Agriculture Canada, IDRC and CIDA may be foreseen in facilitating the development and application of biotechnology to food production. Ultimately, export opportunities relating to this biotechnology may be available.

The knowledge portion of the value-added component of traded goods and services has increased dramatically over the last 30 years. The

need for an efficient system of intellectual property protection, which allows laboratories and firms to reap the benefits of their research has, therefore, become very important. International harmonization in intellectual property protection is being pursued in the GATT Uruguay Round.

Given the complexities of biotechnology research and development and its very high cost, the environmentally sound application of biotechnology will demand specific attention to creating new partnerships among researchers, institutions, private companies, entrepreneurs, banks, government departments within DCs and between developed countries and DCs. In so doing, some international and national championing and brokering for progress will be needed, and there is likely to be various demands placed upon EAITC in this regard. Agenda 21's chapters on institution building (Chapters 37-39) have direct application to the facilitation of this process.

CHAPTER CRITIQUE

Surrounding the rapidly growing biotechnology industry are moral and ethical questions which concern tampering with the stuff of life. This chapter may be criticized for devoting insufficient attention to these questions. While mention is made of safety and ethical considerations, their importance is downplayed. Although it is noted on several occasions in the chapter that questions relating to safety and ethics should be acknowledged by decision-makers, there is no suggestion that the future direction of the biotechnology industry may well hinge on the resolution of these questions. While biotechnology is an industry which is here to stay, and is one which will undoubtedly continue to be pursued on many fronts, associated ethical and safety considerations could become increasingly important in coming years as the technology advances; this point is not made in the chapter. From a commercial standpoint, the issue of public acceptance of biotech products or applications is, therefore, a major factor in market success, safety and regulation. These factors are worth noting because of their potential effect upon Canada's biotechnology industry.
Canada has recognized the need for a cohesive and coordinated approach to the international harmonization of safety guidelines for biotechnology. Work on the development of international safety and technical procedures which ensure that the products and processes of biotechnology are being developed and applied in an environmentally sound manner is being undertaken in the OECD.

The dominant role of multinational corporations in biotechnology research and development, technology access, and intellectual property rights was not included in the chapter (mainly due to strong lobbying on the part of the USA). The reason for this omission is that developed countries are concerned that the transfer of technology occurs in a fashion which adequately

compensates those who developed the technology. However, it has been argued by DCs that where technology is based on genetic resources originally found in DCs, these countries should be entitled both to share in the benefits of the technology and should receive some of the financial benefits from its commercial exploitation. These two viewpoints were not reconciled at UNCED and, as a result, the Americans did not sign the Convention on Biodiversity and the subject of intellectual property rights remains unsettled.

The high capital requirement for biotechnology research is not mentioned in the chapter, yet this requirement is a serious constraint upon the ability of DCs to enter this field. However, other chapters such as Chapter 33 (**Financial Resources and Mechanisms**) and Chapter 34 (**Transfer of Environmentally Sound Technology, Cooperation and Capacity Building**), as well as the Biodiversity Convention address funding concerns and should be read in conjunction with this chapter.

While a list is provided in the chapter of all the possible areas where biotechnology could be applied (e.g., agriculture, forestry, fisheries, environment, health products), there is no attempt to prioritize the needs or specific opportunities for DCs. While perhaps beyond the intent of Agenda 21, this information would have been useful from the trade and export perspective, as it is unclear where private and public resources should best be concentrated.

ECONOMIC IMPLICATIONS

The Canadian position on biotechnology is directed by the National Biotechnology Strategy (NBS) - a multi-year, multi-million dollar venture established in 1982 by the Federal Government. Since this time it has fostered the development of biotechnology as an important area of research and has played a role in stimulating the Canadian biotechnology industry. The NBS has designated biotechnology as a "national priority for economic development based upon its future contribution to Canadian resource and manufacturing industries". NBS activities are typically directed towards the speedy development of and application of biotechnology and, until recently, few resources had been devoted to understanding the ecological impacts and ecosystem responses to engineered organisms released into the environment.

There is no single regulatory body or legislation to deal with biotechnology in Canada. Instead, it is covered under several different Acts across five federal departments - Agriculture Canada, Environment Canada, Health and Welfare, Labour Canada and Consumer and Corporate Affairs. Presently Environment Canada is developing new regulations to be included under the Canadian Environmental Protection Act (CEPA) that will require notification and assessments of new technologies. As well, Canada's Green Plan

commits the Federal Government to setting up a national regulatory body to address environmental risks associated with the biotechnology industry by 1995.

Biotechnology is certain to play an important economic role in the future, particularly in the health care sector (e.g., through development of vaccines and drugs). However many applications of biotechnology go beyond this sector to affect other sectors important to the Canadian economy. These applications are summarized as follows.

Mining: Research is being carried out by the biotech industry in conjunction with mining interests to examine how biotechnology can be used to produce less toxic by-products associated with mining and smelting. Biotechnology is also used in mineral recovery; some minerals, for example, can be recovered by bacteria which attach themselves to rocks/ore and produce an acid which leaches out minerals.

Forestry: Biotechnology can be used to improve plant and animal productivity or to increase their adaptive capabilities to specific environments. Genetic engineering, for instance, has the potential to be used to develop fast growing and/or disease resistant trees. Development of such trees for may benefit Canada through reducing pressures on existing forests and maintaining or enhancing timber output.

Agriculture: The use of biotechnology in agriculture has exhibited the potential to produce high yield crops. Further developments in this sector would only seem to be limited by the amounts of money applied to research and development.

The use of integrated pest management and reduction of chemical pesticides and fertilizers, as encouraged in this chapter, can be promoted through biotechnology; to do so, however, would involve weaning the agriculture sector away from production processes which have long relied upon the use of inorganic pesticides and chemicals - major industries unto themselves in Canada and elsewhere.

Food Products: This industry is particularly affected by the application of biotechnology in the areas of food additives and in developing larger or more nutritious plant or animal products. The international harmonization of safety procedures and development of an international code of conduct, would contribute to increased costs of doing business in this sector.

Chemicals and Chemical Products: These industries use biotechnology applications in production processes with, for example, genetically-engineered organisms frequently being used to produce highly specialized chemicals. The industry may, however, be forced to adapt as environmentally sustainable biotech products usurp the role of traditional products (e.g., biological agents instead of

chemical pest control).

Machinery and Equipment: Opportunities exist for the Canadian development and export of new equipment for biotechnology purposes.

Service Industry: The lack of suitably trained people, both in Canada and abroad, in the area of biotechnology is a barrier to the development of industrial applications of biotechnology. There is no doubt, however, that there is a growing market for the uses of biotechnology available for the service industry to exploit. Problems associated with waste management, for instance, are becoming increasingly urgent globally and are representative of areas in which the application of biotechnologies hold considerable promise. The limiting feature in this application may be the lag time during which the service industry develops the expertise to widely apply the technology available.

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CHAPTER 17 - Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi-Enclosed Seas, and Coastal Areas and the Protection, Rational Use and Development of Their Living Resources

The marine environment - including the oceans and all seas and adjacent coastal area - forms an integrated ecosystem that is an essential component of the global life-support system and a store of natural capital which, if properly managed, presents opportunities for sustainable development. Sustainable and integrated approaches to marine and coastal area management and development are reflected in the following programme areas covered in this chapter:

(1) Integrated management and sustainable development of coastal areas, including exclusive economic zones;

(2) Marine environmental protection;

(3) Sustainable use and conservation of marine living resources of the high seas;

(4) Sustainable use and conservation of marine living resources under national jurisdiction;

(5) Addressing critical uncertainties for the management of the marine environment and climate change;

(6) Strengthening international, including regional, cooperation and coordination; and

(7) Sustainable development of small islands.

Each of these programme areas is summarized below.

Integrated Management and Sustainable Development of Coastal Areas, Including Exclusive Economic Zones

With more than half of the world's population living within 60 kilometres of the shoreline, this programme area recognizes both the importance of coastal areas and the need for environmentally sustainable management of marine and coastal resources.

It is proposed that coastal states, in conjunction with international organizations, undertake a variety of measures which serve to integrate coastal and marine management and sustainable development plans. These plans, for example, would relate to: contingencies for human induced and natural disasters, inventories of marine resources, waste disposal facilities, conservation and restoration of altered critical habitats, and environmental impact

assessment of major projects.

Marine Environmental Protection

Although land-based sources contribute 70% of marine pollution, there is no global scheme to address marine pollution from these sources. Much of the remaining 30% of total pollution is caused by shipping and sea-based activities, including accidental and illegal oil discharges. The objectives of this programme area centre on applying "preventive, precautionary and anticipatory" approaches to reduce the risk of degradation to the marine environment. To fulfil these objectives, recommended activities are aimed at meeting the Montreal Guidelines for the Protection of the Marine Environment from Land-Based Sources. Specific activities are proposed which prevent, reduce and control degradation of the marine environment from both land-based and sea-based activities.

Sustainable Use and Conservation of Marine Living Resources of the High Seas

The rapid expansion in high seas fisheries in recent years has not been matched by effective and sustainable management practices. There are problems of unregulated fishing, overcapitalization, excessive fleet size, incorrect fishing gear, vessel reflagging to escape controls, unreliable data bases regarding fish stocks, and lack of cooperation among states. Signatories to Agenda 21 committed themselves in this chapter to the conservation and sustainable use of marine resources on the high seas, including the implementation of General Assembly resolution 46/215 on large-scale pelagic drift-net fishing.

States are encouraged to take action, including bilateral and multilateral cooperation to ensure that high seas fisheries are managed in accordance with the provisions of the United Nations Convention on the Law of the Sea. It is proposed that a intergovernmental convention be held "as soon as possible" to promote implementation of the provisions of the United Nations Convention on the Law of the Sea on straddling fish stocks and highly migratory fish stocks.

Sustainable Use and Conservation of Marine Living Resources under National Jurisdiction

Globally, marine fisheries yield some 80-90 million tons of fish and shellfish per year, 95% of which is taken from waters under national jurisdiction. Fisheries in many areas under national jurisdiction, however, face problems of local overfishing, unauthorized incursions by foreign fleets, ecosystem degradation, overcapitalization and excessive fleet sizes, undervaluation of catch, insufficiently selective gear, unreliable data bases and

increasing competition among fishing interests and with other types of activities.

Activities recommended in this programme area are aimed at promoting sustainable use of marine living resources under national jurisdictions. To realize this potential requires steps toward improving knowledge relating to these resource stocks, use of new technologies, better handling and processing facilities to avoid wastage, and improved quality and training of skilled personnel to effectively manage marine living resources under national jurisdiction.

Addressing Critical Uncertainties for the Management of the Marine Environment and Climate Change

This programme area is based on the recognition that the marine environment is vulnerable to climate and atmospheric changes. Small increases in sealevel, for example, have the potential to cause significant damage to many coastal areas. To determine the role of the oceans and seas in driving global weather systems and to predict natural and human-induced changes in marine and coastal environments, the mechanisms to collect and disseminate information from research activities needs to be restructured and reinforced. In addition, the effects of ozone depletion upon marine life needs much more research.

Activities are geared at increasing national and international efforts to strengthen scientific and technological capabilities for analysing, assessing, cataloguing and predicting global climate and environmental change.

Strengthening International, Including Regional, Cooperation and Coordination

Implementation of the strategies and activities under the programme areas of this chapter require effective institutional arrangements at national, subregional, regional and global levels. There is a need to improve coordination and strengthen links among the various institutions, inside and outside the United Nations system, having competence in marine issues. A full paragraph is devoted to reinforce the view that trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Sustainable Development of Small Islands

Small island developing states tend to be ecologically and economically vulnerable. The ocean and coastal environment is, for

these states, of strategic importance and constitutes a critical means for development. Climate change will have profound effects on small islands, in terms of sealevel changes and increasing weather disturbances. The international community must assist small island states to adopt and implement programmes both to cope with the effects of climate change and to support the sustainable development of their marine resources, including meeting essential human needs, maintaining biodiversity and improving the quality of life of island people.

The estimated annual cost of the activities in these programme areas are $13.142 billion U.S. between 1993 and 2000, including about $640 million U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 17

The marine environment provides major economic benefits to Canada and other countries which rely on Canadian marine exports. Ocean related industries contribute approximately $8 billion to the Canadian economy and support in excess of 1 million jobs. Understandably, therefore, issues concerning the High Seas fisheries were of prime importance to Canada at UNCED. It was, in fact, Canada's objective to place the marine environment on a par with the atmosphere and forests as a priority issue requiring global political attention.

Negotiations surrounding this chapter were relatively contentious. In PrepComs leading to UNCED, the Canadian delegation pushed for recognition of the special interest of coastal states in managing fish stocks that straddle the dividing line between waters under national jurisdiction and the high seas. Thirty-nine states joined Canada in sponsoring a resolution containing the principles that will be addressed in a proposed international conference on the High Seas fisheries to be held in New York this July. At this gathering, nations will seek agreement on a set of internationally enforceable rules for high seas fishing which are consistent with principles already contained in the United Nations Convention on the Law of the Sea.

To put this chapter into perspective, some background on work which has been done regarding protection of the marine environment is helpful. In addition to work at UNCED, policy approaches to marine pollution have been determined through seven main exercises over the past decade:

-participation in negotiations on the United Nations Law of the Sea Convention (UNCLOS) (1982 to present);

-development of the 1985 Montreal Guidelines on land-based sources of marine pollution (LBSMP);

-preparation of the December 1990 Green Plan;

-Canadian initiatives at recent G-7 Summits (1990 Houston Summit and 1991 London Summit);

-development of a Federal Marine Environmental Quality (MEQ) Framework (currently under consideration)*;

-the Arctic circumpolar agreement.

Also, in the Fall of 1991, the Federal Government announced a five-year Ocean Dumping Control Action Plan, which includes stringent regulations prohibiting the ocean disposal of industrial wastes; a strengthened scientific basis for controls; and a national research and information program to help address the presence of persistent plastic debris in the oceans.

In proceedings leading to UNCED, Canada had the following objectives:

1) promote a global strategy for the prevention, reduction and control of LBSMP;

2) promote a comprehensive approach to Coastal Zone Management (CZM) without compromising national sovereignty over living marine resources;

3) ensure an institutional framework within the UN system for regular consideration of oceans issues;

4) establish a mechanism to continue work on Agenda 21, which could include a global oceans conference;

5) promote wider ratification, implementation and participation in the MARPOL convention;

6) support the consideration of an International Convention on Offshore Oil and Gas Activities;

7) promote the better integration of data and information systems designed to monitor the marine environment, and provide support for country reporting on MEQ; and

8) ensure the incorporation of Canadian values such as the role of NGOs, women and indigenous peoples in decision-making.

These results were achieved at PrepCom IV and, except to the extent that Canada (and others) would have preferred stronger commitments, particularly in LBSMP, are reflected in this chapter. There was consensus among nations that there existed a need to revisit the 1985 Montreal Guidelines on LBSMP with a view to preparing a global strategy or instrument on this issue. However, the possibility of

a binding convention on LBSMP remains an open question.
From the EAITC perspective, the chapter's 3rd and 6th programme areas are of particular relevance. In both areas, the importance of bilateral and multilateral cooperation is emphasized with respect to Canada's participation in international programming and organizations. As such, EAITC, with other departments, will have responsibility to deliver on a number of the respective recommendations.

CHAPTER CRITIQUE

From the Canadian perspective, there is little to criticize in this chapter, as most of what Canada hoped to achieve was realized. One of the few criticisms of this chapter which has arisen, is that while much is said about addressing land based sources of pollution (LBSMP), no specific mention is directed at dealing with the main cause of marine pollution, which is municipal sewage and waste discharges.

ECONOMIC IMPLICATIONS

Implications of this chapter's proposals upon various of Canada's industrial sectors are as follows:

Mining: Land based sources of airborne marine pollution to be regulated could include metal smelters and oil refineries. Most smelting, refining and fabricating operations, however, have no significant impact on marine pollution.

Proposed compensation and liability regimes would cover the shipping of hazardous and noxious substances. These would include metals and metal bearing products (because many are classified as hazardous), perhaps leading to increased shipping costs.

Forestry: The impact on oceans comes from both the harvesting and processing stages. Clearcutting on steep slopes, (notably in British Columbia), can increase sediment load into streams, adversely affecting salmon productivity. In addition, logs which are stored in rivers and estuaries can end up as wood waste in oceans. Pulp and paper mills, particularly old ones, are potential contaminators of estuaries and coastal areas. High levels of organochlorines produced in the kraft bleaching process, such as dioxins and furans, can cause the closure of commercial and sport fisheries, as it did in B.C. for crab, shrimp and prawn. More stringent standards for the treatment of pulp and paper effluent appears to be reducing the problems of toxic contaminants.

Agriculture: Use of pesticides and fertilizers in agriculture would be influenced by proposals in this chapter. Runoff of nitrogen and phosphorus from fertilizers can contribute to the formation of

oxygen depleting algal blooms in ocean bays. The reduction in use of chemical pesticides and fertilizers would require the agricultural sector to modify its production processes given the sectors's present heavy reliance on these artificial inputs.

Transportation: The transportation of chemicals, petroleum and hazardous wastes can cause problems due to the possibilities of leakages, spills and operational discharges. Impacts on the sector come from the possibility of strong regulations in case of mishaps, as well as from stricter regulations for maintenance. For example, a serious economic implication would be the call for the establishment of facilities at all sea ports for the collection and disposal of oil, chemical residues and garbage. Compliance with such a call would require waste collection and treatment facilities to be provided in marinas and small scale facilities run by the departments of Fisheries and Oceans, Transport Canada, and private operators. Needless to say, the costs for achieving these standards would be high.

Energy: The development of off-shore oil and gas would be affected by stricter Exclusive Economic Zone management practices as called for in this chapter. While off-shore oil and gas development is not currently significant in Canada, it is expected to increase its share significantly by the year 2000 (to more than 10% of Canadian production) through such projects as Hibernia. Projects of this nature, however, would be all the less defensible with respect to the objectives of this chapter.

Food Products: Approximately 150,000 Canadians depend on the fisheries for their livelihoods. It is one of the largest commercial fishery industries in the world and although it is not a major contributor to the aggregate national economy, it is very important to the regional economies of Canada. The fish and marine products industry would benefit from actions designed to prevent overfishing outside of Canada's 200 mile zone and to promote clean, productive waters - particularly in view of the recent collapse of the North Atlantic cod stocks.

While aquaculture in Canada has grown rapidly in recent years, its activities are still relatively modest compared to traditional commercial production. Most efforts are concentrated in salmon farming, but other species of relevance to this chapter include trout, oysters and mussels. Regulations to control the introduction of new species for aquaculture might restrict opportunities for the expansion of this activity.

Machinery and Equipment: Industry would be required to have facilities for collection and disposal of waste oil, chemical residues and garbage; compatible and appropriate equipment would be needed to conduct these operations in an environmentally sound manner. There would, therefore, be new niches for Canadian manufacturers of machines and equipment which meet these needs.

*
Canada's development of a Federal Marine Environmental Quality (MEQ) Framework will be a key channel for meeting Agenda 21's call for national action plans on Coastal Zone Management (CMZ) and LBSMP. A detailed analysis by Environment Canada has indicated that the Agenda 21 and Canadian agendas for MEQ are very similar, with the exception that the Agenda 21 proposals are sometimes more specific.

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CHAPTER 18 - Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources

This chapter was included in Agenda 21 in recognition of the importance of ensuring global water supplies "of good quality are maintained for the entire population of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities within the capacity limits of nature and combating vectors of water-related disease". In addition, the "widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management". With respect to these objectives, the following programme areas are proposed:

(1) Integrated water resources development and management;

(2) Water resources assessment;

(3) Protection of water resources, water quality and aquatic ecosystems;

(4) Drinking-water supply and sanitation;

(5) Water and sustainable urban development;

(6) Water for sustainable food production and rural development;

(7) Impacts of climate change on water resources.

The highlights of these programme areas are collectively outlined as follows.

As populations and economies grow many countries are rapidly reaching conditions of water scarcity and/or water pollution which are untenable for the purposes of sustainable development. The management of freshwater as a finite and vulnerable resource and the integration of sectoral water plans within the framework of national economic and social policy are of great importance. To this end, by the year 2000 all states should, if capable, initiate national water management programmes, including costs, targets, institutions and laws. Freshwater resources should be assessed and protected and national goals set for freshwater use, quality, protection and improvement. Research, national data bases of water resources, and global dissemination of information connected to freshwater issues are also needed. In addition, the sustainable management of water as a scarce resource includes an obligation to

incorporate in planning and development processes, the full cost of water resources used. As such, standards for discharges should be set, facilities built to treat sewage and the principle of "the polluter pays" invoked.

The extent and severity of contamination of wet lands and aquifers have been underestimated owing to the inaccessibility of aquifers and a lack of reliable information on aquifer systems. The protection of groundwater, including the promotion of education and training programmes on water-related topics, is an essential element of water resource management and a number of activities are recommended in this chapter which would encourage this protection.

The role for DC capacity building is clear; provision of clean water resources and protection of water ecosystems from pollution requires considerable upgrading of most countries' present freshwater capacities. Water-quality management programmes require a certain minimum infrastructure and staff to identify and implement technical solutions and to enforce regulatory action. A key problem will be the sustained operation and maintenance of these facilities.

An estimated 80 per cent of all diseases and over one third of all deaths in DCs are caused by consumption of contaminated water, and on average as much as one tenth of each person's productive time in these countries is sacrificed to water-related diseases. Domestic and international efforts during the 1980s brought water and sanitation services to hundreds of millions of the world's poorest people. The most outstanding of these efforts was the launching in 1981 of the International Drinking Water Supply and Sanitation Decade, which resulted from the Mar del Plata Action Plan adopted by the United Nations Water Conference in 1977. The commonly agreed premise was that "all peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs". To implement the activities recommended to provide safe drinking-water and sanitation will require an estimated $20 billion U.S. annually between 1993 and 2000.

Achieving food security is a high priority in many countries, and agriculture must not only provide food for rising populations, but also save water for other uses. This chapter recommends a number of activities aimed at developing and applying water-saving technologies and management methods to agriculture and, through capacity building, introducing institutions and incentives for rural populations to adopt these technologies and methods.

Global climate change is recognized in this chapter as having the potential to negatively impact fresh water supplies. Entire growing zones could change and intrusions of salt water could have a major impact on aquifers and low coastal areas. As a result, the development and implementation of response strategies to climate

change is required. Consistent with the United Nations Framework Convention on Climate Change, this chapter recommends further research into the potential impacts of climate change on freshwater resources and upon social and economic conditions in areas likely to be affected by climate change.

The total annual cost (1993-2000) of the programmes presented in this chapter is estimated at $54.7 billion U.S., including about $17 billion U.S. from international sources on grant or concessional terms.

DISCUSSION OF CHAPTER 18

Two main principles are evident in this chapter: water resource management and water resource pricing. Taken together, these principles mean that water should no longer be considered a free good. Comprehensive and integrated water resource management, including interlinkages between surface and groundwater, is advocated at all levels of jurisdiction (international, national and local). The approach suggested in this chapter is that first priority should go to meeting basic human freshwater needs and the safeguarding of ecosystems; beyond these requirements, water users should be charged on a full cost basis. The **Environment as a Valuable Resource** theme is in evidence throughout this chapter because, as an increasingly scarce resource, there is a clear perception that freshwater must be made available to all people in an efficient and equitable manner if sustainable development is to be realized. Indeed, the chapter sets the year 2000 as a target to achieve: at least 40 litres of freshwater per urban resident; the establishment of discharge standards for municipal and industrial effluent; and the environmentally sound collection, recycling, or disposal of 75% of the solid waste from urban areas. (18.58)

Considering water as an economic good and applying economic instruments to water (e.g., water pricing, taxes, licenses) can be very useful in encouraging conservation and discouraging large-scale inefficient water use. There are, however, a couple of concerns worth mentioning. First is the question of equity. Application of market pricing to water use could mean that those with means will get the water and those who cannot afford it will not. For example, over recent years, the Massachusetts Water Resources Authority has applied full cost pricing to its municipal water services in the Boston area. This approach has resulted in the highest municipal water and sewer bills in the United States. Without a legislative or fiscal mechanism to mitigate the regressive application of these charges, a far greater financial burden is placed on relatively poor people than on those who are relatively. It may be concluded that the equity issue will become more significant to policy makers as water gets more scarce and as its economic value increases.

A second concern about treating water as a commodity is that it negates water's non-economic importance. The ecological functions of water are essential to the health of whole ecosystems. Water is also of great spiritual and psychic value to people, however difficult or impossible it may be to assign a price to this value. Treating water as an economic good, therefore, does not guarantee its conservation for ecological, social, heritage, spiritual or cultural purposes - all criteria which are assigned much credence throughout Agenda 21.

This chapter is of interest to Canada for two main reasons. First, as a country with one of the largest stores of freshwater and a neighbour to the south quickly exhausting its own water resources, there may be increasing demands upon Canada's freshwater in coming years. A desire for many Canadians, for example, is to see the prohibition of large-scale water exports to the U.S. Moreover, the need for water in the U.S. can be said to at times be less than entirely legitimate given that country's instances of well chronicled inefficient and non-sustainable water use (e.g., rapid depletion of the Ogalala Aquifer which underlies much of the American midwest). In addition, much remains to be understood concerning the hydrological cycle and its environmental ramifications if disrupted. The long-term ecological impacts altering water ecosystems to suit human economic purposes are, therefore, not understood.

Implementation of long-term national integrated water management plans of the type called for in this chapter are important for Canada, as they are for DCs. Collectively, the freshwater objectives, targets and actions of Agenda 21 touch on many areas of federal, provincial and municipal responsibility, since the management of Canada's freshwater resources is shared among all three levels of government. Many of this chapter's goals and proposed activities are addressed in Canada by existing or planned programs at the federal, provincial and municipal levels. Legislation, programs and institutions are generally in place to meet the Agenda 21 requirements; in other cases programs are being developed (e.g., National Action Plan on Global Warming). There are areas, however, where existing programs do not fully meet the objectives of Agenda 21 and where Canadian performance needs attention. Among the key concerns are:

- Canada does not have a comprehensive national programme for the management of freshwater. Instead, Canada has a number of basic action plans, programs, legal instruments and policies targeted toward specific water management needs. It should, however, be noted that a single national plan is not considered realistic or necessary in view of Canada's large and diverse geographic area and different levels of government;

- many people would like to see federal standards for drinking water which apply across Canada;

- protection of water quality and water pollution control is an area in which more research is needed and to which standards are lacking, particularly regarding industrial source pollution;

- in Canada's urban areas, many water and wastewater systems are nearing the end of their design life and need expensive rehabilitation. Almost one-third of municipal discharges to inland waters in Canada are untreated. These areas are identified in Agenda 21 as areas in which a number of countries will have to devote resources and Canada is no exception;

- concerning water use, Canadians are among the highest per capita users of water and efforts to encourage conservation have been very limited in their success. Higher water tariffs, although bound to be resisted by those who have become accustomed to viewing water as a free good, could be implemented to encourage conservation. Moreover, simply reflecting the capital costs needed to upgrade and build the infrastructure needed to provide clean water and wastewater throughout Canada would more adequately reflect the full cost of water; and

- some native communities still lack adequate water supply and sanitation services.

The second reason why this chapter concerns Canada is that with increasing global needs for freshwater, particularly with respect to DC irrigation practices, Canada has a role to play in capacity building and technology transfer in this regard. For example, over the last 5 years CIDA has supported numerous water projects, committing over 16% of its spending on Environment and Development Programming (second only to Population projects in total spending).

Water is among the most critical elements of sustainable development. Global water demands are increasing rapidly with some 70-80% needed for irrigation, 20% for industry and only 6% for personal use. Canada is a recognized leader in water management, water quality monitoring and water related education and training. Canadian water management standards and practices on the local level (river basin conservation authorities), on the regional and national levels (provincial agencies, Environment Canada), and on the international level (International Joint Commission) place Canada in the forefront relative to most other nations. Consequently, any action toward better water management requested in DCs or elsewhere, might be an opportunity for the transfer of Canadian knowledge and technology from the service industries and from the machinery and equipment sector.

In the areas of water conservation, waste water reduction, and water treatment, the Canadian situation is less encouraging. Water consumption per capita is among the highest in the world and waste water reduction and water treatment have plenty of room for improvement.

In addition, Agenda 21 proposals on freshwater may have implications for Canadian aid policies and programs in the water sector, as external support agencies are frequently identified as funding sources for program areas. Implications could be both financial and program-related (e.g., increased emphasis on capacity building in DCs for strengthening of water resources assessment networks).

CHAPTER CRITIQUE

Because of the linkage between adequate freshwater and sustainable development, a variety of cross-cutting issues are in evidence in this chapter. These issues concern: international cooperation, resource accounting, forestry and other land use activities in watersheds, health (e.g., disease transmission through water borne vectors), oceans and agricultural practices. This chapter should, therefore, be read in conjunction with chapters 2 (**International Cooperation to Accelerate Sustainable Development**), 6 (**Protection and Promotion of Human Health**), 7 (**Promoting Human Sustainable Settlement Development**), 11 (**Combatting Deforestation**), 12 (**Combatting Desertification and Drought**), 14 (**Promoting Sustainable Agriculture and Rural Development**), and 17 (**Protection of Oceans and their Living Resources**).

The chapter may be criticized on a few fronts. More than most Agenda 21 chapters, this chapter frequently provides recommendations which "could" be undertaken by signatories rather than which "should" be undertaken. Such terminology diminishes the onus upon signing states to carry out the recommendations and, consequently, weakens the chapter.

More detail, particularly quantitative, on how significant the problems of adequate freshwater availability are would also have served to make this chapter stronger and clearer. In addition, one issue which is noted in the chapter, but not followed up on in the recommendations, concerns the extent to which water resources development contributes to economic productivity and social well being. This chapter would have been stronger had this connection been forcibly made.

ECONOMIC IMPLICATIONS

Some comments about the role of freshwater to the Canadian economy are appropriate. As an often overlooked economic resource, freshwater plays an essential role in the continuing development of Canadian industry. Many of Canada's natural resource based industries rely heavily on large volumes of freshwater throughput. Canada, with its cold climate, relatively high labour costs, and distance from many of its markets, has few competitive advantages compared to manufacturing plants located further south. One such advantage is freshwater availability, which can reduce the

comparative cost of a manufacturing or resource extraction/development facility significantly - if the full cost of water used is also borne by foreign competitors. To this end, it is Canada's best economic interest to ensure that to the extent full cost pricing of water is instituted in Canada, it also be established elsewhere.

Regarding the effects of this chapter on the Canadian economy, to fully meet Agenda 21 freshwater objectives, considerable expenditures will be required on the part of both the public and private sectors. A careful meshing of the costs of the proposed activities in this chapter with Canada's trade policies prerogatives will therefore, be required to ensure that the costs do not damage Canada's international trade position.

Some significant examples of federal government initiatives consistent with the proposals in this chapter are: the $100 million Sustainable Management Program for the Fraser River Basin (1991); the St. Lawrence River Plan with $110 million from the federal government (1988); and the Great Lakes protocol to the 1978 Great Lakes Water Quality Agreement between Canada and the U.S., with $125 million from the federal government over 5 years (1988).

Some of the potential impacts upon various of Canada's industrial sectors as a result of implementing this chapter's recommendations are evident:

Mining: The mining industry uses significant amounts of water. The pricing of water to reflect its marginal and opportunity costs could have a significant impact upon the industry, adversely affecting its competitiveness. In addition to economic instruments and pricing, legislation aimed at water conservation could mean more stringent requirements on water use, again imposing costs on the industry.

Mining and mineral processing waste waters are often heavily contaminated. Current regulations force the containment and treatment of mining waste waters and tailing to prevent materials from leaching into surface and groundwaters. It is, however, possible that materials can over time leach into water systems and questions of long term liability, due diligence and who pays for cleanup may have to be dealt with by governments and the mining industry.

Forestry: The forest industry is a heavy water user in both the processing of timber and the production of pulp and paper. With the help of government standards and environmentally concerned markets, the industry is moving toward the production of less environmentally damaging pulp, thereby reducing freshwater pollution. However, while recent calls to further reduce toxins in effluent through, for example, the elimination of chlorine bleaching, are being hailed by environmentalists, they will mean

large capital costs will be incurred by an industry hard hit by the recession.

Harvesting can also have a negative impact on water resources. Clearcutting has been shown to accelerate erosion and nutrient loss to streams, with the possible damming or eutrophication of nearby bodies of water. It should be noted, however, that clearcutting standards, (which most Canadian forestry companies now follow), have tended to largely reduce this occurrence.

Energy: In the oil industry, as conventional oil discoveries diminish, oil recovery techniques for using water injection into existing wells and to extract oil from tarsand deposits, can be expected to increase the demand for freshwater and to create a growing wastewater treatment problem. More stringent wastewater treatment standards combined with the use of economic instruments to promote rational water use would mean that water is no longer considered a free good, thereby increasing costs for the industry.

Where hydroelectricity is concerned, a number of environmental impacts are possible. The reservoirs behind dams are liable to silting; health problems from increased mercury in the water can affect the health of individuals who are dependent on fish as a staple diet; and flooding of land has well known environmental and social impacts. However, with the exception of the James Bay area in Quebec and Northern Manitoba, most of Canada's hydroelectric potential has already been exploited. As a result, the proposals in this chapter which would affect the manner in which further hydroelectric development occurs, are limited in their overall effect upon the Canadian economy.

Food Products: The food and beverage industry is a relatively small water user compared to other industries. However, the full cost pricing of water would increase costs for this sector. If foreign competitors are not faced with similar full costs, then the Canadian industry could be at a competitive disadvantage.

The industry is also a contributor to water pollution and is therefore subject to effluent regulations. Some wastes from food processing plants tend to be compatible with municipal waste treatment processes, although there are exceptions that need additional treating prior to being discharged. The proposals in this chapter relating to wastewater treatment and clean technologies would add to the cost burden of this sector.

Chemicals and Chemical Products: Freshwater plays an important role in production processes in the chemical industry; large volumes of freshwater are often used for production. Resulting hazardous chemicals can leak into freshwater, affecting aquatic life and creating health hazards (e.g., the Great Lakes situation). Canada, both nationally and internationally (e.g., through the International Joint Commission) has been addressing this issue and

standards are in place which promote cleaner technology in both the production and disposal of toxic chemicals. While more can be done to improve pollution problems relating to this sector, Canada is already easily meeting the requirements of this chapter. As a result, this chapter poses minimal further impacts for the sector.

Machinery and Equipment: This sector could be affected in a number of positive ways. With full cost pricing of water, there will be increased demand, both domestically and abroad, for equipment which makes more efficient use of water in production, irrigation and personal consumption.

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Chapter 19 - Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products

While substantial use of chemicals is accepted as necessary to meet the social and economic goals of the world community, there are two major problems, particularly as pertains to DCs. First, there is a lack of sufficient scientific information on a great number of chemicals. As a result, the proper assessment of risks associated with use of these chemicals can be insufficient or non-existent. Second, there is a lack of resources available to undertake the assessment of the effects of chemicals produced.

Six programme areas are proposed:

1) Expanding and accelerating international assessment of chemical risks;
2) Harmonization of classification and labelling of chemicals;
3) Information exchange on toxic chemicals and chemical risks;
4) Establishment of risk reduction programmes;
5) Strengthening of national capabilities and capacities for management of chemicals; and
6) Prevention of illegal international traffic in toxic and dangerous products.

Collaboration on chemical safety between the United Nations Environment Programme (UNEP), the International Labour Organization (ILO) and the World Health Organization(WHO) in the International Programme on Chemical Safety (IPCS) should be the nucleus for international cooperation on environmentally sound management of toxic chemicals. All efforts should be made to strengthen this programme.

There is widespread concern that frequently the international movement of toxic and dangerous products is carried out in contravention of existing national legislation and international instruments, to the detriment of the environment and public health of all countries, particularly DCs.

The six programme areas are overviewed as follows.

Expanding and Accelerating International Assessment of Chemical Risks

A serious problem is that for a great number of chemicals, of which some 100,000 are in commercial use, crucial data for risk assessment are often lacking. Obtaining this data must be given priority and should be undertaken on an international basis. Among the objectives should be development of guidelines for acceptable exposure to various of the many of chemicals in use.

It is recommended that the United Nations system in conjunction with other multilateral organizations enhance programmes for chemical risk assessment testing and data collection. Governments are encouraged to take the lead in promoting collusion among government, industry, academia and relevant NGOs in pursuing activities which improve the understanding of chemicals and their risk to human health.

Harmonization of Classification and Labelling of Chemicals

Adequate labelling of chemicals and the dissemination of safety data sheets such as ICSCs (International Chemical Safety Cards) and similarly written materials, based on assessed hazards to health and environment, are the simplest way of indicating how to handle chemicals safely. A globally harmonized hazard classification and labelling system is not yet available. It is the objective of this programme area to develop such a system, by the year 2000 if possible.

Governments should take measures necessary to launch a project directed at "establishing and elaborating a harmonized classification and compatible labelling system for chemicals for use in all United Nations official languages...". The main qualification is that such a system not lead to the imposition of unjustified trade barriers.

Information Exchange on Toxic Chemicals and Chemical Risks

This programme area recognizes the importance of information sharing among nations with regard to the costs and benefits of chemicals. Reference to the London Guidelines for the Exchange of Information on Chemicals in International Trade is made, particularly the Prior Informed Consent (PIC) procedures.

Recommended activities are directed at encouraging the implementation of PIC procedures and to strengthening international institutions responsible for information exchange on toxic chemicals.

Establishment of Risk Reduction Programmes

There are often alternatives to toxic chemicals currently in use. Risk reduction can, therefore, be achieved by using other chemicals or non-chemical substitutes. Other areas of risk reduction to be encouraged include the prevention of chemical accidents, prevention of poisoning by chemicals and the undertaking of "toxicovigilence" and coordination of clean-up and rehabilitation of areas damaged by toxic chemicals.

Activities are directed at eliminating unacceptable or unreasonable risks and, to the extent economically feasible, to reduce risks posed by toxic chemicals. A wide range of risk reducing options are recommended relating to the manufacturing, trade, transport, use and disposal of hazardous wastes.

Strengthening of National Capabilities and Capacities for Management of Chemicals

Most countries lack scientific means of collecting evidence of misuse of toxic chemicals and of judging the impact of toxic chemicals on the environment. Significant new uses are among the potential hazards to human health and the environment, particularly in DCs. As management of chemicals takes place within a number of sectors within a country, a coordinating mechanism is essential. It is the objective of this programme area to see national systems for environmentally sound management of chemicals to be in place in all countries by the year 2000 to the extent possible.

To meet this objective, recommendations are directed at governments to: promote institutional mechanisms to manage chemicals; develop or strengthen emergency response capability; and establish or strengthen a national coordinating mechanism to provide a liaison for all parties involved in chemical safety activities.

Prevention of Illegal International Traffic in Toxic and Dangerous Products

There is currently no global agreement on traffic in toxic and dangerous products (toxic and dangerous products are those that are banned, severely restricted, withdrawn or not approved for use or sale by Governments to protect public health and the environment). There is concern that illegal traffic in these products is occurring and is causing damage to health and the environment. As a result, further strengthening of international and regional cooperation is needed to prevent illegal transboundary movement of toxic and dangerous products. It is particularly important to assist DCs to obtain appropriate information concerning illegal traffic in toxic and dangerous products.

Activities are proposed which put in place national legislation preventing the illegal movement of toxic and dangerous products and which is backed by appropriate enforcement programmes.

The total annual cost (1993-2000) of the programmes presented in this chapter is estimated at $647 million U.S., including about $150 million U.S. from international sources on grant or concessional terms.

DISCUSSION OF CHAPTER 19

For perspective on the importance of this chapter to global environmental management and sustainable development, some facts are helpful:
-every day 3 to 5 new chemicals enter the marketplace;
-eighty percent of these new chemicals are not tested for toxicity;
-every day, approximately one million tons of hazardous wastes are generated in the world, 90% of which are in the industrialized world;
-about 85% of chemicals used in Canada are imported;
-a large number of toxic substances are metals, but the majority are chemicals. The major problem with toxic chemicals is that they are fat soluble and therefore tend to bioaccumulate in the food chain.

The effects of handling toxic substances is often insidious, as consequent problems may not manifest themselves for many years. Gradual leaching of toxic chemicals into groundwater and genetic damage resulting from exposure to certain toxic chemicals are two obvious examples of why a sense of immediacy may be absent in addressing the effects of toxic chemicals. Moreover, the synergistic effects of numerous toxic chemicals released into the same ecosystem is often simply unknown. It is clear, however, that use of toxic chemicals are both necessary to economic growth, (at least in the short term), and pose a serious environmental threat if not handled correctly. Consequently, discussion of the economic costs to be incurred in moving toward sustainable development would be incomplete without acknowledgement of the environmental and economic implications of toxic chemical usage.

Canada's Environmental Protection Act (1988) provides the authority to implement many of the government-related activities outlined in this chapter. In July 1991 the federal government established a National Office of Pollution Prevention within Environment Canada to promote a shift of pollution prevention from "react and cure" to "anticipate and prevent". The Office is presently developing, in coordination with the provinces, a strategy framework for pollution prevention in Canada. As part of the Green Plan, a National Pollutant Release Inventory database, listing major Canadian industrial pollutants, where they are found, and in what quantities will be established and available for public use. As well, in 1991 a "New Directions Group", composed of representatives from industry and environmental groups recommended that a process to reduce or phase out selected toxic substances be established. This resulted in the establishment in February 1992 of an ARET (Accelerated Reduction or Elimination or Toxics) committee composed of representatives from labour, business/industry, environmental groups and the federal and provincial governments.

The Committee is developing criteria for selecting substances for action and setting targets for reduction. The implementation of the

process will rely entirely on voluntary compliance by all groups involved. A Pollution Prevention Initiative was also established for the Great Lakes and St. Lawrence basin in March 1991, backed by $125 million in federal funding from Environment Canada (See Chapter 18 review). Overall, Canada's approach to managing toxic chemicals is to combine regulatory controls with pollution prevention, and to work with industry to control and reduce both toxic chemicals and their emissions. There appears, therefore, to be little reliance on market or economic based incentives (as advocated in Agenda 21) to address the management of toxic substances in Canada.

CHAPTER CRITIQUE

Because of its commonality with several other chapters, this chapter should be read with Chapters 20 (**Hazardous Wastes**), 21 (**Solid Wastes and Sewage**), 22 (**Radioactive Wastes**), and 34 (**Transfer of Technologies**). None of the chapters clearly define the different wastes, thus an overlap may be seen to exist among them at times in their dealing with waste issues.

Although the chapter encourages the role of "community right-to-know programs", it has nonetheless been criticized for giving insufficient emphasis to community involvement and participation in all aspects of decision-making and management pertaining to toxic substances; the main efforts in such decision-making are relegated to governments and industry.

In terms of its structure, the chapter may be criticized on the grounds that there are overlaps among various programme areas. The importance of risk assessment, for example, is dealt with repeatedly in a number of programme areas. Redundancy of this nature tends to make the issue at question appear somewhat ambiguous as it may not be clear into which realm within the chapter the issue properly belongs.

ECONOMIC IMPLICATIONS

It is apparent that both opportunities and costs for Canadian industry are engendered by this chapter. Opportunities exist in such areas as toxic chemical risk assessment specialization and research development related to toxic chemical substitutes. Costs exist in meeting more stringent regulations, domestically and internationally, on the use, movement and disposal of toxic substances and in financing the development and use of alternatives. The chapter, for example, encourages a reduction in the dependence on agricultural chemicals through alternative farming practices. Hence, while such substitution is of considerable merit for the purposes of sustainable development, there are clearly costs to be borne in the transition to more

environmentally benign substitutes.

Notwithstanding the important role of substitutes for toxic chemicals, access to new chemicals has been and will likely remain essential for research and development. Any restrictions on access could, therefore, result in a loss of competitiveness if other nations are not similarly restricted. For this reason, internationally agreed upon policies relating to the harmonization of standards for risk assessment and toxic substance labelling and transport are important.

The most apparent sectoral impacts in Canada relating to this chapter's recommendations are as follows:

Mining: The main issue for this sector is that metals are classified as toxic chemicals. Therefore, research on substitutes for toxic chemicals implies research into substitutes for metals. Substitution away from metals produced in Canada would likely have negative consequences for the industry.

In addition, the potential for trade barriers against certain mining products could be significant if the process of international risk assessment results in the banning of movement of hitherto freely moved substances (e.g., asbestos). It should be noted that Canada took the position that because Agenda 21 is not intended to be a regulatory document, it was not appropriate to identify specific chemicals in its text. This proposal succeeded. Instead, Canada proposed that bans or phase-outs on toxic chemical production should be considered as last steps and only after control and safe management were deemed inadequate. This proposal was made in recognition that the phase out of production of severely restricted chemicals could affect trade on several major Canadian metals and minerals, such as cadmium, lead, mercury, and asbestos.

Forestry: Because the forest industry is a user of toxic chemicals, programmes on international risk assessment may result in the creation of trade barriers for wood products which use or produce certain chemicals in their manufacturing process. Canada earns significant export revenue from the forest and forest products industries, and any barriers to trade could be extremely detrimental to the Canadian economy.

Agriculture: Risk reduction programmes can affect the agricultural sector by encouraging or requiring its investment into the substitution of harmful chemicals by less harmful ones.

With respect to prior informed consent (PIC) procedures, some additional costs to the sector can be incurred because of information exchange requirements among nations on all potentially toxic chemicals.

Transportation: Proposals in this chapter to harmonize classification and labelling of hazardous wastes and chemicals may have a significant impact on the transportation sector if the proposals result in a universal system which is incompatible with systems already in use in the domestic and international transport of dangerous goods.

Energy: Requirements for clean technologies would likely pollutants emitted from the combustion of fossil fuels. The energy sector would accordingly be faced with compliance costs.

Chemicals and Chemical Products: This sector is the supplier of toxic chemicals to other industries. As a result, measures to reduce use of toxic chemicals by industry, as well as increased public awareness and information on the risks of those chemicals, would affect the sector from management, investment and operational points of view. Movements toward the use of cleaner technologies would affect product demand as well as both the means by which toxic chemicals may be produced, and how they may be disposed.

Machinery and Equipment: Additional safety requirements on the movement of toxic substances would create the need for further modification of machinery and equipment to handle these substances. Concurrently, domestic and export opportunities will arise for Canadian producers of this machinery and equipment.

Service Industry: Domestic and international opportunities will exist for risk assessment specialists and for research and development into alternatives to presently used toxic substances.

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CHAPTER 20 - Environmentally Sound Management of Hazardous Wastes, Including Prevention of Illegal International Traffic in Hazardous Wastes

Effective control over production and handling of hazardous wastes is a necessary component of sustainable development. Priority, therefore, should be given to prevention of the generation of hazardous wastes and the rehabilitation of contaminated sites. There is concern on the part of many countries that the international movement of hazardous wastes is being conducted in contravention of existing legislation, to the detriment of the environment and public health of all countries, particularly DCs.

The overall objective of this chapter is to "prevent to the extent possible, and minimize, the generation of hazardous wastes, as well as to manage those wastes in such a way that they do not cause harm to health and the environment". In fulfilment of this objective, ratification of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is urged. (Canada ratified the Convention in August 1992 and it will come into effect in Canada in November, 1993).

The following programme areas are included in this chapter:

1) Promoting the prevention and minimization of hazardous waste;
2) Promoting and strengthening institutional capacities in hazardous waste management;
3) Promoting and strengthening international cooperation in the management of transboundary movements of hazardous wastes; and
4) Preventing illegal international traffic in hazardous wastes.

Each of these programme areas is summarized below.

Promoting the Prevention and Minimization of Hazardous Waste

There are increasing direct and indirect environmental, social and individual costs in connection with the generation, handling and disposal of hazardous wastes. A priority in hazardous waste management should be minimization, as part of a broader approach to changing industrial processes and consumer patterns through cleaner production strategies. To this end and in adherence to the "polluter pays" principle, economic incentives need to be explored as a means to prevent the generation of hazardous wastes.

The recommended activities are directed at encouraging governments to provide legislation and standards regarding hazardous wastes. Information bases of hazardous wastes should be maintained and "cradle to grave" (i.e., production to disposal) hazardous waste

monitoring regimes should be adopted. Economic incentives to stimulate industrial innovation and application of cleaner production methods, including recycling of wastes and environmentally sound waste disposal should also be developed and applied.

A "relevant and competent" United Nations organization should take the lead, in cooperation with other organizations, to develop guidelines for estimating the costs and benefits of various approaches to the adoption of cleaner production and environmentally sound management of hazardous wastes.

Promoting and Strengthening Institutional Capacities in Hazardous Waste Management

For a variety of reasons, many countries lack the capacity to handle hazardous wastes. Moreover, there is still considerable ignorance about the effects of environmental contamination on ecosystems and people. Immediate steps are necessary to identify populations at risk from exposure to hazardous wastes and to take remedial measures. Research on the nature and environmental impacts of hazardous wastes is necessary as is the need to strengthen the capacities of institutions that are responsible for the management of hazardous wastes.

In fulfilment of the above objectives, it is recommended that governments, often in collaboration with industry and the United Nations and other organizations, take measures to assess risk exposure to its populations, provide classification systems of hazardous wastes, encourage establishment of treatment/disposal facilities for hazardous wastes in small- and medium-sized industries, and implement educational, training and research activities related to evaluation, prevention and control of hazardous waste.

In line with the objectives of the Basel Convention, self-sufficiency in hazardous waste disposal in the country of origin is encouraged, provided it is done so in an environmentally sound manner. The transboundary movements that take place "should be on environmental and economic grounds and based upon agreements between all States concerned".

Promoting and Strengthening International Cooperation in the Management of Transboundary Movements of Hazardous Wastes

To promote international cooperation in the management of transbcundary movements of hazardous wastes, there is a need to strengthen international cooperation and to establish international criteria to identify and classify hazardous wastes. It is also important to prohibit the export of hazardous wastes to countries

that do not have the capacity to deal with those wastes in an environmentally sound manner, or that have banned the import of such wastes.

Recommended activities are directed at governments, with the cooperation of the United Nations and other relevant organizations, to strengthen and harmonize international criteria and regulations relating to the management of transboundary movements of hazardous wastes.

Preventing Illegal International Traffic in Hazardous Wastes

The prevention of illegal traffic in hazardous wastes will benefit the environment and public health in all countries and will help support the Basel Convention by promoting compliance with the controls established in that agreement. Effective prevention requires effective monitoring of hazardous waste movement and the enforcement of appropriate penalties.

Recommended activities are aimed at reinforcing national capacities to detect and halt any illegal attempt to introduce wastes into the territory of any State in contravention of national and international legislation. Governments are expected to develop the necessary national enforcement programmes to monitor compliance with such legislation.

The estimated annual costs (1993-2000) of meeting the recommendations of this chapter are $18.5 billion U.S., including about $1.3 billion U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 20

In Canada, hazardous wastes are controlled through the Export or Import of Hazardous Waste Regulations under the Canadian Environmental Protection Act (CEPA). Although Canada has ratified the Basel Convention (along with 33 other countries) as called for in Agenda 21, many of Canada's large trading partners, such as the United States and the EEC, have not. The reason ratification has not taken place is that these countries do not yet have domestic legislation in place, such as Canada's Export or Import of Hazardous Waste Regulations; such legislation is a necessary precursor to support ratification of the Basel Convention.

With regard to the above programme areas, the 3rd and 4th fall within federal jurisdiction and are under the purview of the Export or Import of Hazardous Waste Regulations. The 1st and 2nd programme areas fall largely within provincial authority although, as provided in the Green Plan, the federal government is working with

industry to reduce hazardous waste production by 50% by the year 2000. In addition, non legally binding federal guidelines are being developed by the federal government (in conjunction with the provinces) to promote meeting the objectives of the second programme area.

This chapter does not oblige Canada to undertake new commitments in respect to hazardous waste management. Canada has already made commitments to the goals of this chapter through the Green Plan, OECD and UNEP. For example, the emphasis placed on minimizing the generation of hazardous wastes is addressed in the Green Plan and the control of transboundary movements of hazardous wastes is covered under the Export or Import of Hazardous Waste Regulations.

However, notwithstanding that Canada is already meeting its Agenda 21 commitments with respect to hazardous wastes, the recommended activities within this chapter and the contents of domestic legislation, may nonetheless have a strong impact on Canadian industry. The push towards the adoption of "clean technologies", for instance, will have an effect on certain sectors of the Canadian economy, depending on how and when they are adopted and according to the definition of "clean" which is employed.

There is an emphasis in this chapter on the use of economic instruments to prevent pollution and upon the "polluter pays" principle for remediating damages caused by hazardous wastes. (The polluter pays principle is, for instance, mentioned 3 times in the chapter). This emphasis is consistent with Agenda 21's reliance upon market forces to enable the realization of global sustainable development. As mentioned below, however, application of this principle would not be without costs for various sectors of the Canadian economy.

CHAPTER CRITIQUE

The chapter may be criticized on the grounds that recommended activities give too much responsibility to governments as compared to community organizations, NGOs and institutions in the management of hazardous wastes. (A similar criticism has been levelled at Chapter 19). For example, in respect to the cause and resolution of hazardous waste problems, local communities are considered rather passively (see 20.18.c, 20.27.a.b.c.), as opposed to the very active role of governments and industry. Similarly, almost all of the recommended activities are largely directed at dealing with hazardous wastes produced by big corporations (20.1); environmental problems derived from hazardous wastes produced or managed by local small and medium industries are given minimal consideration, yet collectively, they contribute greatly to the problem.

ECONOMIC IMPLICATIONS

The following impacts upon Canadian industry relating to this chapter are evident.

Mining: Proposals to adopt "clean technologies" could lead to phasing out the production of chemicals deemed harmful to the environment. Depending upon which chemicals are affected, there could be impacts upon production of several Canadian metals and minerals. For example, as environmentally harmful elements such as cadmium and lead are by-products of the exploitation of zinc deposits and mercury is a by-product associated with the smelting of sulphur and nickel, the production of zinc and nickel could be affected.

Recycling of metals is an important element of metal processing. The economic viability of secondary markets depends on the free trade from sources of materials to smelters and steel mills. Since metals are considered toxic chemicals, many recyclable scrap materials are classified as hazardous waste. Regulations on transboundary movement of hazardous waste could lead to trade barriers by preventing Canadian smelters from importing scrap metal, hence interfering with trade in secondary materials. More specifically, consideration of the effects of this chapter upon the mining industry should not be done without respect to the OECD Recyclables Decision. This legally binding legislation requires members of the OECD to take steps toward recycling, where possible, of the substances used in production. This legislation is consistent with the recycling initiatives called for in Agenda 21 (See S.20.33 and S.20.34).

Forest Industries: The concern is mainly with the pulp and paper mills and the hazardous waste which comes from the bleaching process. The industry may be subject to increased monitoring and reporting and will, in addition, have to incur the capital costs necessary to meet more stringent effluent regulations currently being proposed and/or implemented by provincial governments.

Transportation: The major concern with hazardous wastes in this sector comes from the possibility of accidents occurring while moving waste from one location to another. Invoking the polluter pays principle as proposed may result in cost implications for the transportation sector and may introduce yet another facet of liability insurance - a plus for the insurance industry perhaps, but an additional cost for the transportation sector.

Energy: The nuclear industry is a major target when hazardous waste is considered, because there are no predefined safety threshold values for nuclear waste; even minute amounts of such waste must be treated in a hazardous waste facility. Currently, the concept that has been developed for disposal of high level disposal of nuclear wastes is undergoing a federal environmental assessment review.

Knowledge gained in Canada on handling nuclear waste may, in future, be an exportable service if increasing use of nuclear power in other countries occurs.

Chemicals and Chemical Products: As a large generator of hazardous wastes, this sector stands to experience potential impacts from the adoption of national and international standards relating to hazardous wastes which differ from those to which it now abides (i.e., Export or Import of Hazardous Waste Regulations under the Environmental Protection Act, Basel Convention).

Machinery and Equipment: Opportunities exist for this sector to develop and export technologies to better deal with hazardous waste disposal and recycling problems and to phase out old, inefficient machinery and equipment.

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Chapter 30 - Strengthening the Role of Business and Industry

Because of the important role business and industry "including transnational corporations" must play in increasing prosperity and, consequently, achieving sustainable development, they should be full participants in the implementation and evaluation of activities related to Agenda 21. Business and industry should recognize environmental management as among the highest corporate priorities and as a key to sustainable development. The contribution of business and industry to sustainable development can increasingly be achieved by using economic instruments such as free market mechanisms in which the prices of goods and services should reflect the environmental costs of their input, production, use, recycling and disposal subject to country-specific conditions.

The following two programme areas are presented:

1) Promoting cleaner production; and
2) Promoting responsible entrepreneurship.

Promoting Cleaner Production

In view of production processes which are in many instances both inefficient and polluting, optimal efficiencies at every stage of the production cycle should be an objective. Governments, business and industry should, therefore, aim to increase the reuse and recycling of residues, and to reduce the quantity of waste discharge per unit of economic output. Besides the environmental benefits of pursuing this objective, a further result would be the improvement in the overall competitiveness of the enterprise. Both economic instruments and legislation can be used to promote the use of cleaner and more efficient production.

International and non-governmental organizations, including trade and scientific associations, should strengthen cleaner production information dissemination by expanding existing databases, such as the UNEP International Cleaner Production Clearing House (ICPIC), the UNIDO Industrial and Technological Information Bank (INTIB) and the ICC International Environment Bureau (IEB), and should forge networking of national and international information systems.

Promoting Responsible Entrepreneurship

Entrepreneurship is a driving force for innovations, increasing market efficiencies and responding to challenges and opportunities. This driving force should be used to promote sustainability and entrepreneurs should be encouraged both to adopt the concept of stewardship in the management of natural resources, and to increase

the number of entrepreneurs engaged in enterprises that subscribe to and implement sustainable development policies.

Governments in collaboration with business and industry should encourage the establishment and operation of sustainably managed enterprises, through such means as:

-economic incentives and regulatory mechanisms;
-establishment of venture capital funds for sustainable development projects;
-supporting of training in the environmental aspects of enterprise management; and
-establishing partnership schemes between small and large business and industry to facilitate information exchange pertaining to environmentally sustainable entrepreneurship.

The activities included under the above programmes are mostly changes in the orientation of existing activities and additional costs are not expected to be significant. The cost of activities by governments and international organizations are already included in other programme areas in other chapters (e.g., Chapter 8 - **Integrating Environment and Development in Decision-Making**)

DISCUSSION OF CHAPTER 30

As is discussed in Section I- Premises, Agenda 21 is based on the assumption that economic prosperity brought about largely through private sector initiatives will be the means by which sustainable development can be achieved and maintained. This notion constitutes the main message of the chapter. The role of governments and institutions is considered to be secondary in this regard and is limited to aiding and abetting business and industry to undertake environmentally sustainable investments and production processes.

This chapter reflects uneasiness concerning the role of businesses in sustainable socio-economic development. The qualification "including transnational corporations" is added to the phrase "business and industry" no less that sixteen times in seven pages. This appears to represent some sensitivity about the image of transnationals in the developing world.

Canada has undertaken several initiatives germane to the thrusts of this chapter and which bear mention in this report. The former Canadian Council of Resource and Environment Ministers (now the Canadian Council of Ministers of the Environment (CCME)) set up the National Task Force on Environment and the Economy in 1987. The goal was to involve leaders in government, industry, business, and environmental groups in a dialogue on environment-economy integration and to "remove barriers to environmentally sound economic development". One of the Task Force's recommendations was that the ten provinces and two territories establish multi-sectoral

Round Tables on Environment and the Economy. This model resulted in the National Round Table on the Environment and the Economy (NRTEE), which is composed of senior leaders from all sectors of society. The NRTEE evaluates and reports on the effects of policies and decision-making on the environment; promotes sustainable development practices in the field of waste management; supports sustainable development internationally; and develops ways of communicating principles of sustainable development.

CHAPTER CRITIQUE

A weakness in the chapter is the loose use of the word "sustainability", as it is frequently used as a synonym for "more efficient" or "cleaner". These operational definitions may be seen to be so wide as to allow virtually any improvements in production efficiency to be construed as a step toward sustainability.

This chapter should not be read in isolation of several other chapters. Questions of technology transfer (Chapter 34), international institutions (Chapter 38), resource valuation (Chapter 8) and consumption patterns (Chapter 4) all have a bearing on what is said in this chapter. For example, there is no recognition that much of the environmental crisis at the global level stems in large part from consumption patterns of the developed countries. Simply increasing the efficiency of these patterns, as is encouraged in this chapter, may not necessarily lead to sustainability as is suggested. As such, Chapter 4's emphasis on promoting changes to consumption patterns is not reflected in this chapter - perhaps because these changes may be seen as incompatible with the profit-oriented interests of business and industry.

Similar to Chapter 34, this chapter strongly suggests that industrial development in DCs be a priority. What appears to be missing, however, is mention of the importance of tracking performance of technologies, sectors, or industries and firms with respect to the environmental sustainability of business practices. Performance measurement in this regard could, for example, be tracked by a member of the United Nations system, such as the Commission on Sustainable Development.

Finally, emphasis should have been placed on why it is increasingly in the enlightened self-interest of business and industry to adopt sound environmental management strategies purely on their own accord; the message that effective environmental management is often simply astute business acumen could have been given higher profile.

ECONOMIC IMPLICATIONS

Canadian businesses and industries are increasingly recognizing that more efficient production is good for business and often good for the environment - and therefore the public. Accordingly, industry is investing more heavily than ever before in pollution abatement or pollution prevention technologies - often in advance of legislation directing it to do so. It is not unreasonable to expect costs of this nature to rise over coming years, as environmental pressures and consumer expectations on corporate environmental management continue to build.

Conversely, opportunities for Canada's environmentally sound technology (EST) industry should become increasingly prevalent in tandem with the growing need for pollution abatement and prevention technologies.

Business and industry associations are following environmental issues more closely and are developing awareness training and environmental policies for their members. In addition, codes of conduct and standards are being adopted, such as the International Chamber of Commerce's Business Charter on Sustainable Development and the chemical industry's Responsible Care initiative.

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Chapter 31 - Scientific and Technological Community

This chapter focuses on how to enable the scientific and technological community to make a more effective contribution to decision-making processes concerning environment and development. It is an objective of the chapter to enable the scientific and technological community to better communicate its role to decision-makers and the public. The relationship existing between the scientific and technological community and the general public should be deepened wherever possible.

Two programme areas are presented in the chapter and outlined below:

1) Improving communication and cooperation among the scientific and technological community, decision makers and the public; and

2) Promoting codes of practice and guidelines related to science and technology.

Improving Communication and Cooperation Among the Scientific and Technological Community, Decision Makers and the Public

As suggested in the title to this programme area, the scientific and technological community - which includes engineers, architects, industrial designers, urban planners and other professionals should increase their interaction amongst one another to implement strategies for sustainable development. The objectives are to extend and open up the decision-making process between the scientific and technological community and the decision makers and to improve the exchange of knowledge between the scientific and technological community and the general public.

Several activities are recommended which are directed at promoting the responsiveness of the scientific community to the environment and the need for sustainable development.

Promoting Codes of Practice and Guidelines Related to Science and Technology

This programme area exists in respect to the growing level of ethical awareness which has come to permeate environmental and developmental decision-making. The objective is to develop and promote international acceptance of codes of practice relating to science and technology. These codes would respect the integrity of life-support systems and the important role of science and technology in reconciling the needs of environment and development.

Recommended activities are aimed at strengthening national and international cooperation to develop codes and practices regarding environmentally sound sustainable development. It is also suggested that environment and development legal instruments be reviewed to ensure they incorporate appropriate codes of practice.

The estimated annual cost (1993-2000) of implementing the activities of these programme ares are about $30 million U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 31

The subject of this chapter is cross-cutting in nature, as it is addressed in nearly all other chapters under the heading "Means of implementation"; the emphasis placed by Agenda 21 on the importance of the scientific and technological disciplines to promote sustainable development cannot be understated.

This chapter is relevant to Canada for two main reasons. As a country having a strong scientific base relative to most countries, and with expertise in a number of technologies, trade opportunities springing from Agenda 21's emphasis on capacity building and technology transfer are abundant and may become even more so in the years ahead. In addition, it is in Canada's best interest to support efforts, such as those proposed in this chapter, which promote the role the scientific community can play in achieving sustainable development and which generally serve to make the community more open and accountable to the public.

Canada's Green Plan includes a five-year environmental science and technology action plan that will provide funds for research into global and domestic environmental issues; scholarships to encourage academic research in the environmental sciences; revitalization of federal government research facilities, and additions to their scientific staff; and assistance with technology transfer and government-industry partnerships necessary to bring new technologies to market.

Canada is a leader in many fields undergoing development and implementation in DCs, such as agriculture, hydroelectricity and subways. The Canadian government, in conjunction with the private sector and DC governments, could have the credibility to elaborate guidelines for voluntary codes of professional and corporate conduct concerning the environment in DCs. Furthermore, the meeting of these codes by DCs could be a useful condition for the provision of foreign aid. However, the availability of such a criterion would be obviated if there were no monitoring mechanism in place. As professional associations are known to monitor their members in Canada, this role could be extended beyond national borders with regard to environmental codes and ethics. The alternative would be to have a central monitoring body, such as the Commission on

Sustainable Development. However, this prospect appears to offer an opportunity to take advantage of the self-policing function of professional associations. As such, the monitoring role could be effectively performed in a decentralized fashion, rather than in a centralized manner by the U.N.

CHAPTER CRITIQUE

The encouraging of ethical behaviour by professionals with respect to a safe environment is well expressed in this chapter as is the need for consultative processes between the scientific and technological community and governments, NGOs and the public. The message is quite clear and, as such, leaves little room for argument. However, the definition and constitution of the "scientific and technological community" is not apparent. Within this broad term are numerous multi-sectoral, private and public niches with differing industry and association standards and regulations to which members must abide. For this chapter to imply, therefore, that this huge community speaks with one voice is misleading and perhaps makes the chapter somewhat more ambiguous than it would otherwise be.

Proposals in the chapter call for explicit action by governments to review issues, communicate about science and technology, and cause codes of practice to be implemented. There is, consequently, no specific onus on private organizations to take the lead on developing and implementing the ethical standards called for in this chapter. However, the scientific and technological community is largely private sector based and some mention of the role of business and industry participation would not have been out of place. Indeed, as the chapter follows Chapter 30 -- **Strengthening the Role of Business and Industry**, this lack of mention is all the more striking.

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CHAPTER 33 - Financial Resources and Mechanisms

This chapter deals with the financing of Agenda 21 activities recommended in other Agenda 21 chapters. The basis for this chapter is the need to provide DCs with the financial resources necessary to implement their Agenda 21 commitments. For an evolving partnership among all countries of the world enhanced and predictable levels of funding in support of long term objectives, such as those in Agenda 21, are required. The objective of this chapter, therefore, is to encourage the implementation of funding mechanisms to provide "new and additional financial resources that are both adequate and predictable". In addition, it is emphasized that long-term DC financial solvency along with mutually supportive economic growth and environmental protection, will be derived not through provision of direct external funding, but mainly through free trade and access to markets.

For DCs, particularly the least developed countries, Official Development Assistance (ODA) is a main source of funding. At UNCED developed countries committed themselves to the UN target of 0.7% of GNP for ODA and to reach this target as soon as possible. Among the various sources of funding are:

(i) The International Development Association (IDA) - The text of Agenda 21 directs IDA to give special consideration to the statement by World Bank President Lewis Preston at UNCED. In that statement Mr. Preston proposed that additional funds be made available to IDA - specifically that the amount given to replenish IDA funds for the 1993-95 period (the IDA-10 replenishment) be at a level that would maintain IDA-9 funding in real terms. He also proposed that part of the World Bank's net income ($1.2 billion U.S. annually) be allocated to the IDA as an "Earth Increment" that would fund national environmental projects. This proposal, however, has not been realized and there is to be no Earth Increment. (Canada's multi-year contribution to the latest IDA replenishment is about $830 million CDN);

(ii) Regional and subregional development banks;

(iii) The Global Environment Facility (GEF). The GEF is managed jointly by the World Bank, UNDP and UNEP. Its funding is designed to achieve global benefits pertaining to relevant environmental issues, and is to be sufficient to cover the agreed incremental costs of Agenda 21 activities, in particular for DC's. Canada has already provided $25 million CDN to the GEF;

(iv) The relevant specialized agencies, other UN bodies and other international organizations, which have designated roles to play in supporting national Governments in implementing Agenda 21;

(v) Multilateral institutions for capacity building and technical

cooperation, in particular the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). Canada has committed itself to giving $2 million CDN to the UNDP in a 3 year pilot project to assist in preparation of national sustainable development plans, and to double its contribution to UNEP to $11 million CDN over the next 5 years;

(vi) Bilateral assistance programmes;

(vii) Debt relief - for low and middle income countries, including debt swaps (described in Section I of this report);

(viii) Private funding - voluntary contributions through non-governmental channels have been running at about 10% of ODA;

(ix) Investment - mobilization of higher levels of foreign direct investment and technology transfers should be encouraged through national policies that promote investment and through joint ventures and other modalities; and

(x) Innovative financing - new ways of generating new public and private financial resources should be explored (e.g., forms of debt relief, fund raising, various economic and fiscal incentives).

It is recognized that ongoing review and monitoring of Agenda 21 financing is essential. Responsibility for this role is discussed in Chapter 38 (**International Institutional Arrangements**).

The estimated annual costs (1993-2000) of implementing the activities in Agenda 21 in developing countries are over $600 billion U.S., including $125 billion U.S. in technical and economic assistance on grant or concessional terms from developed countries. For perspective, the annual volume of ODA is now about $55 billion U.S., so Agenda 21 is calling for a $70 billion annual increment to this amount. Donor countries refused to ratify this increase, and succeeded in including language in the Agenda 21 financing sections specifying that they were "indicative and order of magnitude estimates only, and have not been reviewed by governments." Hence, the $600 million U.S. figure is not expected to be realized.

DISCUSSION OF CHAPTER 33

The financing of Agenda 21 proved to be a matter on which little agreement was reached during the pre-UNCED Prepcom sessions. Among the most contentious of the financing questions concerned the long-standing ODA target of 0.7% of GNP adopted by many developed countries (the U.S. not being one of them). The main criticism in regard to this target is that no firm deadline was established on when it would be achieved (even though some countries, such as Japan and France, are planning significant increases in their ODA over the next few years, and some countries have already achieved

the 0.7% target). Allowing developed countries to increase ODA to 0.7% "as soon as possible" ensures, in the eyes of many, that governments will have no impetus to ever achieve the target. For perspective, Canada is now giving about 0.4% of GNP to ODA - about $3.0 billion CDN. Therefore, 0.7% would amount to some $5.3 billion CDN annually. Canada was among the countries firmly opposed to a fixed deadline for achieving the 0.7% target. The source of the new and additional Canadian ODA funds which Canada needs to increase its ODA expenditures is unclear. Moreover, there is concern among many parties that Canada's contribution to other funding mechanisms will come from existing bilateral programs or from the ODA budget. It should be noted, however, that the PM and Minister Charest both made it quite clear at UNCED that increases in Canadian ODA should not be expected for the next few years.

A Canadian objective at UNCED (which was articulated by CIDA) was that agreements on financing not divert funds from critical developmental objectives such as poverty reduction.

CHAPTER CRITIQUE

A major criticism is that Agenda 21 does not devote attention to reducing the global trade in arms - worth over $1 trillion U.S. annually. Despite the staggering financial and nonfinancial costs to humanity of the effects of this trade, scant attention is paid in Agenda 21 to redirecting resources away from trade in arms to other purposes. Agenda 21 does not recognize these expenditures as being a misallocation of resources and a severe hindrance to pursuing sustainable development initiatives. Instead, only one reference to this misallocation appears in the entire Agenda 21 document:

"New ways of generating new public and private financial resources should be explored, in particular: ...(e) the reallocation of resources at present committed to military purposes." (33.16.)

There are two separate facets to the issue of military spending to be aware of. The DCs viewed paragraph 33.16 as referring to developed countries re-directing portions of their military budgets to ODA - the so-called peace dividend arising from the collapse of the USSR. Developed countries saw it more as a good governance issue which requires changes in the budgeting of developing countries. Developed countries wanted paragraph 33.16 to specifically note that all countries had to address the issue, while DCs preferred the actual wording since they can ignore any implication it may have for them and argue that it refers only to developed countries.

Given the importance of the arms trade for both exporting and importing nations, absence of discussion in Agenda 21 on reducing this trade is perhaps not too surprising. Nonetheless, Agenda 21

has been widely criticized for not dealing strongly with this important issue. There would, moreover, seem to be a case for Canada to make aid assistance to DCs conditional upon a curbing of military expenditures in recipient countries.

A further criticism concerns the lack of a definition for the term "new and additional" resources which are called for in this chapter. It has been argued that this term simply has no meaning and provides no impetus to governments since it was never defined in the negotiations. The Department of Finance might argue, for example, that anything Canada decides to do today that was not planned yesterday would fit "new and additional" and that the source of the funding is irrelevant.

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CHAPTER 34 - Transfer of Environmentally Sound Technology, Cooperation and Capacity Building

The activities recommended in this chapter recognize that new and efficient environmentally sound technologies (ESTs) will be essential to "increase the capabilities, in particular of developing countries, to achieve sustainable development, sustain the world's economy, protect the environment, and alleviate poverty and human suffering." ESTs are less polluting, use resources more efficiently, recycle more wastes and handle residual wastes better than the technologies they replace. Proposed activities are as follows:

1) **Development of international information networks which link national, subregional, regional and international systems**

This activity aims at ensuring a system is established to disseminate information relating to ESTs to DCs, with a focus on the specific technology needs of end users. International information networks and regional clearinghouses should be developed for agriculture, industry and energy.

2) **Support of and promotion of access to transfer of technology**

This activity consists of a number of steps aimed at encouraging the private sector to transfer ESTs to DCs. It is suggested that national policies (including subsidies, taxes and regulations) be employed to encourage the private and public sectors to become innovative, to market and use environmentally sound technologies and to remove barriers to transfer.

3) **Improvement of the capacity to develop and manage environmentally sound technologies**

Subregional, regional and international frameworks to enable the development, transfer and application of ESTs are encouraged to be established or strengthened within this activity.

4) **Establishment of a collaborative network of research centres**

To enhance information sharing and technology transfer, this activity encourages collaboration and information sharing among research centres on ESTs.

5) **Support for programmes of cooperation and assistance**

Under this activity, governments provide financial support toward programmes which promote research and development activities as well as the dissemination of environmentally sound technology information and training assistance in the application of this technology.

6) Technology assessment in support of the management of EST

This activity's objective is to ensure that DCs have technology assessment capabilities which allow them to make informed choices in the application of ESTs. Also included is the conducting of environmental impact and risk assessments, with due regard to appropriate safeguards on the transfer of technologies subject to prohibition on environmental or health grounds.

7) Collaborative arrangements and partnerships

Long-term collaborative arrangements should be promoted between suppliers and recipients of ESTs in an effort to facilitate transfer of these technologies and to build a trained human resource pool.

The estimated total annual cost (1993-2000) of implementing the activities of this chapter is between $450 million and $600 million U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 34

The two most sensitive issues regarding technology transfer are concessionality (i.e., whether DCs should pay commercial rates for needed technologies) and intellectual property rights in the transfer of these technologies - mainly from developed to developing countries. The chapter adopts a relatively cautious note on both. There is a call for transfer of technology on "concessional and preferential terms", but only "as mutually agreed". Concurrently, in the chapter (and elsewhere in Agenda 21) the necessity to guard against the abuse of intellectual property rights is cited. This concern is consistent with Agenda 21's overall emphasis on market-based incentives to promote sustainable development.

CHAPTER CRITIQUE

The chapter may be criticized for devoting too little attention to the effects of ESTs on employment, poverty, income distribution and gender concerns. Additionally, little attention is directed at the non-technical complexities of technology-needs assessments relating to DCs, such as ethical or social concerns associated with technology transfer.

The key assumption underlying this chapter is that sustainable development practices will be increasingly dependent upon the advancement and wide application of EST's. As such, if economic growth is to progress as Agenda 21 envisages and encourages, it is essential that the environmental impacts of this growth be mitigated through use of ESTs. Also because of the broad scope of this chapter, there is both overlap with other chapters (e.g.,

Chapter 37 - **National Mechanisms and International Cooperation for Capacity Building**) and only a few references to specific types of technology which might provide a focus for international efforts with respect to technology transfer.

ECONOMIC IMPLICATIONS

While most EST's have been and will continue to be developed and used in the developed countries, the implementation of these technologies must also occur in DCs if sustainable development is to be achieved. This chapter is clear that market forces can and should be the vehicle to promote the transfer of environmentally sound technologies to DCs. Notwithstanding the impediments to technology transfer caused for proprietary reasons, the main impediment to technology transfer is the limited purchasing power of DCs. Where this power is lacking, the role of developed and developing country governments to provide policies to encourage the private sector to innovate and market ESTs may come to bear (e.g., through implementing subsidies and taxes).

It may be argued that governments, working domestically and multilaterally, have a legitimate and useful role in facilitating EST transfer; the role of government may be in the exercise of regulatory authority that will create and sustain market demand for EST innovation and implementation. Put simply, if sufficient incentives and disincentives are created for the private sector to view ESTs as a relatively stable growth market, then the private sector will tend to respond with R&D expenditures and investments toward EST implementation.

As discussed in the **Environment as a Valuable Resource** theme, identifying and internalizing the environmental costs of production are necessary to reflect operational costs which include environmental inputs. Governments can, therefore, influence the economic and accounting policies to be followed in determining income. In many instances, when the environmental cost of doing business is considered, the overall cost for a company will increase. The higher the costs of managing and disposing of wastes, for example, the greater the incentive to reduce the wastes or pollutants generated through such means as investing in ESTs.

As Canada is a leader in many forms of EST development, matters associated with technology transfer are of considerable relevance. The protection of intellectual property rights associated with development of new technologies, for example, is a concern for Canadian companies with an interest in pursuing export opportunities in ESTs. If, as Agenda 21 envisages, the market is to be the main vehicle to introduce new technologies to DCs, then the private sector will have to be reassured that its proprietary interests in EST research and development will be duly protected. In view of Canada's interest in encouraging trade across all

sectors, EAITC will wish to keep informed of how the field of intellectual property rights evolves and interfaces with EST trade potential.

A distinction has been drawn between "in production" or process oriented ESTs that represent new and innovative technical developments with relatively little operating history and the "post-production" ESTs (i.e., end-of-pipe and waste management technologies) that are adaptations of well understood technologies There is a much greater tendency for the process oriented technologies to be developed by a single user and not for the purpose of marketing the technology. Maintaining proprietary control over such a technology may offer competitive advantage and therefore access to this technology for others can be a problem. In-production ESTs may also involve innovations in the development of new industrial materials for which there will be a strong proprietary interest. The Canadian government would need to be aware of the distinction between the two ESTs in order to properly design policies for each which both facilitate and promote EST transfer - and which respect proprietary interests.

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Chapter 37 - National Mechanisms and International Cooperation for Capacity-Building in Developing Countries

The ability of a country to follow sustainable development paths is largely determined by the capacity of its people and its institutions as well as by its ecological and geographical conditions. Building capacity to implement Agenda 21 requires efforts of individual developing countries in partnership with UN organizations as well as with developed countries. It is essential for countries to identify priorities and determine the means for building the capacity to implement Agenda 21 in view of economic and environmental parameters. Technical cooperation is effective only when it is derived from and related to a country's own strategies and priorities on environment and development.

Objectives are aimed at completing for each country a review of capacity building requirements for devising national sustainable development strategies, including those for generating and implementing Agenda 21 commitments. By 1997, the Secretary General should submit to the General Assembly a "report on the achievement of improved policies, coordination systems and procedures for strengthening the implementation of technical cooperation programmes for sustainable development, as well as on additional measures required to strengthen such cooperation".

The chapter has only one programme area, that of endogenous capacity-building. Its objective is to "develop and improve national and related sub-regional capacities and capabilities for sustainable development". Governments are urged to use a participatory process and to complete a review of capacity- and capability-building needs for their national sustainable development strategies, including their Agenda 21 action programs. To this end governments are asked to undertake the following activities:

Building a national consensus and formulating capacity-building strategies for implementing Agenda 21
-Each country should seek internal consensus at all levels of society on policies and programmes needed for capacity building to implement Agenda 21. UNDP in partnership with relevant specialized agencies and other international intergovernmental and NGO organizations could assist in the identification of the requirements for technical cooperation.

Identification of national sources and presentation of requests for technical cooperation, including that related to technology transfer and know-how in the framework of sector strategies
-Countries desiring arrangements for technical cooperation, including that related to transfer of technology and know-how, with international organizations and donor institutions should formulate requests in the framework of long-term sector or subsector

capacity-building strategies.

Establishment of a review mechanism of technical cooperation in and related to technology transfer and know-how
-The thrust of this activity is to ensure the placement of mechanisms to evaluate existing capacities to integrate environment and development and the role of the transfer of technology and know-how therein.

Enhancement of the expertise and collective contribution of the United Nations system for capacity- and capability-building initiatives
-Organizations within the United Nations system along with the World Bank and regional multilateral development banks, should assist in facilitating capacity building at the country level. The UNDP should undertake funding initiatives making use of its experience in the field of technical cooperation, including that related to transfer of technology and know-how.

Harmonization of the delivery of assistance at the regional level
-At the regional level, existing organizations should consider the desirability of improved regional and subregional consultative processes and round-table meetings to facilitate the exchange of data, information and experience in the implementation of Agenda 21.

The estimated total annual cost (1993-2000) of implementing the activities of this chapter is between $300 million and $1 billion U.S. from the international community on grant or concessional terms.

DISCUSSION OF CHAPTER 37

The notion of capacity building is one of the most cross-cutting subjects appearing in Agenda 21 and is presented in virtually every chapter as a necessary constituent of sustainable development. In addition, the **Application of Science and Technology to Capacity Building** theme (see Section I) is based largely on the precepts of this chapter. For these reasons, the inclusion of this chapter in this report is relevant.

As a result of expertise gained from the development and implementation of the Green Plan, Canada has committed itself to making this expertise available to DCs. Canada is to undertake a number of demonstration projects to transfer this expertise to other countries, particularly in areas related to climate change, forest management and biodiversity. The model forest programme is an example. In addition, Canada will increase funding of key environmental institutions such as the United Nations Environmental Program, the World Meterological Association, the International Union for Conservation of Nature and Natural Resources, the UNESCO World Heritage Committee, and the International Maritime

Organization.

CHAPTER CRITIQUE

This chapter was relatively non-contentious with the main issues resolved during the PrepCom sessions.

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CHAPTER 38 - International Institutional Arrangements

The objective of this chapter is to promote the integration of environment and development issues at national, subregional, regional and international levels, with the intent of achieving sustainable development in all countries. Although the economic implications for Canada of this chapter are not immediately obvious (except to the extent Canada contributes financially to support its recommendations), this report would be incomplete without the chapter's inclusion; it is clear that Agenda 21 implementation will only be possible through continuing and coordinated efforts among relevant national and international institutions, both internal and external to the United Nations system. All countries, including Canada, have a vested interest in ensuring these efforts are fruitful, and for this reason, this chapter is included in this report.

The intergovernmental follow-up to UNCED shall be within the framework of the United Nations system, with the General Assembly (GA) being the supreme policy-making forum that will provide overall guidance to governments and the United Nations system. As noted in the chapter:

> "The United Nations system, with its multisectoral capacity and the extensive experience of a number of specialized agencies in various spheres of international cooperation in the field of environment and development, is uniquely positioned to assist Governments to establish more effective patterns of economic and social development with a view to achieving the objectives of Agenda 21 and sustainable development."(38.3)

Concurrently, governments, as well as regional economic and technical cooperation organizations, have a responsibility to play an important role in Agenda 21 domestic implementation.

The institutional structure of the United Nations system consists of the following:

1) **General Assembly** - As the highest intergovernmental mechanism, the GA is the principal policy-making and appraisal organ on matters relating to UNCED follow-up, including Agenda 21 implementation.

2) **Economic and Social Council** - The Council would assist the GA by overseeing system-wide coordination in the implementation of Agenda 21 and making recommendations to the GA in this regard.

3) **Commission on Sustainable Development** - This body, which would report to the Economic and Social Council, will "ensure the effective follow-up of the Conference, as well as enhance

international cooperation and rationalize the intergovernmental decision-making capacity for the integration of environment and development issues and to examine the progress in the implementation of Agenda 21 at the national, regional and international levels..." As such, the Commission would be responsible for reviewing the progress of members in their implementation of commitments contained in Agenda 21 - including those related to provision of financial resources and transfer of technology. The Commission would consist of representatives of countries elected as members with due regard to equitable geographical distribution. The first meeting of the Commission would be held no later than 1993. Specifics as to its membership, its relationship with other intergovernmental United Nations bodies dealing with matters related to environment and development, and the frequency, duration and venue of its meetings are presently being worked out by the GA.

(4) **The Secretary General** - He/she would be the focal point of the institutional arrangements within the United Nations system for the successful implementation of Agenda 21.

(5) **High-level inter-agency coordination mechanism** - To ensure effective monitoring, coordination and supervision of the involvement of the United Nations system in UNCED follow-up, there is a need for a coordination mechanism under the direct leadership of the Secretary-General. This task should be given to the Administrative Committee on Coordination (ACC), headed by the Secretary-General. ACC would provide a link between the multilateral financial institutions and other United Nations bodies at the highest administrative level.

(6) **High-level advisory body** - A high level advisory board consisting of eminent persons knowledgeable about environment and development, including relevant sciences should be appointed by the Secretary-General. This body will be of value to intergovernmental bodies, the Secretary-General and the United Nations System as a whole.

(7) **Secretariat support structure** - A competent secretariat support structure within the United Nations Secretariat, drawing, inter alia on the expertise gained in the Conference preparatory precess is essential for the follow-up to UNCED and Agenda 21 implementation.

(8) **Organs, programmes and organizations of the United Nations system** - All relevant organs, programmes and organizations of the United Nations system will have an important and often enhanced role within their respective areas of expertise in facilitating Agenda 21 implementation. Some specifics:

- There will be a need for an enhanced role for the United Nations Environment Programme (UNEP) in its role of promoting environmental activities throughout the United Nations system. To perform its new

and enhanced role, and to retain its position as the principal body within the United Nations system in the field of environment, UNEP will require greater expertise and financial resources and closer cooperation with relevant United Nations organs.

-Like UNEP, the United Nations Development Programme (UNDP) also has a crucial role in the follow-up to UNCED. Through its network of field offices, it would support Agenda 21 implementation at country, regional, and global levels while liaising.

- United Nations Conference on Trade and Development (UNCTAD) should play an important role in Agenda 21 implementation given the importance of the interrelationships between development, international trade and the environment and in accordance with its mandate in the area of sustainable development.

- The role of the United Nations Sudano-Sahelian Office (UNSO), operating under the UNDP umbrella and with the support of UNEP, should be strengthened so that it can assume an appropriate advisory and participatory role in implementation of Agenda 21 provisions related to combating drought and desertification and to land resource management.

9) **Regional and subregional cooperation and implementation** - There must be active cooperation and collaboration regarding capacity building and integration of environmental concerns into development policies, among the regional commissions and other relevant organizations, regional development banks, NGOs and other institutions at the regional level.

10) **National implementation** - states have an important role to play in the follow-up to UNCED and the implementation of Agenda 21. States should consider the preparation of national reports and national action plans for Agenda 21 implementation.

11) **Non-governmental organizations (NGOs)** - Relevant non-governmental organizations, including the scientific community, the private sector and women's groups, should be given opportunities to make their contributions and establish appropriate relationships with the United Nations system.

DISCUSSION OF CHAPTER 38

This chapter is of particular importance for the recommendations it offers with respect to the role of different institutions in integrating environment and development at all levels. As such, this chapter is useful for reference purposes regarding specific institutional roles. Of Canadian interest is the role of the Commission on Sustainable Development: the Commission will review information in national reports or periodic communications; and will review information regarding the progress made in implementing

environmental conventions - as opposed to reviewing and/or monitoring progress.
The means through which Canada will liaise with the Commission is not yet known.

CHAPTER CRITIQUE

The chapter is not as specific as it might have been in describing the integration of roles between and among different institutions; only cursory attention is devoted to this subject. The chapter, therefore, would have been more cohesive if, in addition to describing the role of individual institutions, some specific attention had been devoted to describing the institutional linkages which should be pursued and what these linkages could be expected to accomplish.
The chapter focuses on the function of political organizations - namely the United Nations - and devotes little attention to the role of social, scientific and regulatory organizations and NGOs - all of which are needed to achieve sustainable development. (This fact is reflected in **Premises VI** in which the preeminent role of the United Nations in Agenda 21 implementation is observed).

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SECTION III

ORGANIZATIONAL RESPONSES TO AGENDA 21

In this Section, an overview of the status of Agenda 21 follow-up initiatives presently being undertaken by various Canadian and multilateral organizations is provided. The organizations chosen are actively involved in the processes needed to implement Agenda 21. While the list is not exhaustive, an effort has been made to identify and briefly describe those organizations which are the most significant in terms of their size of constituency and their degree of activity in Agenda 21 follow-up. The following Canadian organizations are so involved and are reviewed in this Section.

- National Stakeholders process
- Canadian Council of Ministers of the Environment (CCME)
- International Development Research Centre (IDRC)
- International Institute for Sustainable Development (IISD)
- Canadian International Development Agency (CIDA)
- Indigenous (Inuit Circumpolar Conference)
- National Round Table on Environment and Economy (NRTEE)
- Environment Canada

Following a review of the above organizations, a similar review of the following multilateral organizations is provided:

- Earth Council
- Organization for Economic Cooperation and Development (OECD)
- General Agreement on Tariffs and Trade (GATT)
- Sustainable Development Commission (SDC)
- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- World Bank

Organizational Overviews - Canadian

National Stakeholders Process

At the National Stakeholders Meeting of November 5-6, 1992, it was agreed that the ad hoc National Stakeholder Working Group (which had been responsible for developing the agenda for the November 5-6 meeting) would be tasked with organizing the work agreed to by the National Stakeholders. This work is intended to be complete by the next meeting of the National Stakeholders to be held in June, 1993.

On November 16, 1992, Jean Charest, Minister of the Environment, stated to the House of Commons that the two tasks of the Working Group would include:

1. the development of a document that acts out Canada's commitment at Rio, outlining who is responsible for ensuring that these commitments are met, and to organize a process for identifying gaps; and

2. the development of a framework for preparing an action plan for a sustainable future for Canada that would be referred back to a second National Stakeholders meeting in June, 1993.

The International Development Research Centre (IDRC), the International Institute for Sustainable Development (IISD), and the National Round Table on Environment and Economy (NRTEE) and Environment Canada have each approved contributions of $50,000 to the National Stakeholder process. In addition, a Project Director has been hired coordinate and support the work of the Working Group.

The document under preparation will provide the information necessary to identify where Canada currently is with respect to Agenda 21 implementation. In addition, an information system, under development by IISD, will track progress and contribute to the precess of UNCED follow-up over the coming years - most particularly with respect to the preparation of a Canadian sustainability plan.

Canadian Council of Ministers of the Environment (CCME)

On September 25, 1992, the CCME Deputy Ministers' Committee directed the UNCED Follow-up Task Group to prepare an assessment of the impact of UNCED products on CCME priorities and work plans. In addition, the Task Group was asked to propose a role for CCME in Canada's follow-up to UNCED. CCME subsequently approved a three-point action plan for UNCED follow-up at a meeting in November 1992. The three points included: the

Conventions on Biodiversity and Climate Change, Agenda 21 program strategies and integrated environment/economy decision making.

With regard to the Conventions, CCME supported early ratification and continues to support implementation of both the Climate Change and Biodiversity Conventions. CCME will host a meeting of Environment and Energy Ministers in 1993 to assess progress and implementation of the Climate Change Convention and review possible subsequent steps. In the case of biodiversity, CCME will convene a meeting of relevant Councils of Ministers by 1994 to review progress on the National Strategy on Biodiversity and implementation of the Convention. In addition, CCME is supporting a provincial/territorial representative at the National Biodiversity Office for a two year period.

Under Agenda 21, CCME has identified 7 priority areas for follow-up. These include: human settlements; freshwater; toxic chemicals; hazardous waste; indigenous peoples; the health/environment link; and protection of oceans. Under each of these areas, immediate action items have been identified.

Under the third point, integrated environment/economy decision making, CCME held a workshop in February 1993 on Improved Decision Making. Action will be taken on the recommendations arising out of that workshop. In addition, work is currently being done on harmonizing Federal, Provincial and Territorial "green" plans and sustainable development strategies. Strategies from all jurisdictions are being analyzed and synthesized and an integration framework is being developed as a tool which jurisdictions could use in the updating of strategies.

In January, 1993, the CCME published the "Detailed Report of CCME Task Group for Follow-up on UNCED". This document reviews and prioritizes the Agenda 21 chapters in terms of their urgency for action from the CCME perspective and suggests possible CCME responses to chapter recommendations.

International Development Research Centre (IDRC)

The (IDRC) was created by the Parliament of Canada in 1970 to stimulate and support scientific and technical research by DCs for their own benefit. IDRC has financed some 4500 projects in 100 countries and has a staff of about 400 with a 1992/93 budget of $115 million.

At UNCED, IDRC was chosen by the government of Canada to be one of the key Canadian implementing agencies for Agenda 21. It was felt that greater access by DCs to IDRC expertise would help to ensure a quick start to implementation of Agenda 21 recommendations. As such, IDRC's mandate was broadened to emphasize the environment and sustainable development. It is

intended that IDRC play a leadership and advisory role in both the Canadian and international response to UNCED, particularly in IDRC's area of expertise - research and capacity building. The annual funding of IDRC from the Government of Canada of $115 million will continue.

In addition to being active in the National Stakeholders process, IDRC in conjunction with the United Nations, is also compiling a computer-based archive of UNCED documents (e.g., Agenda 21, PrepCom reports, Conventions, research papers, delegation statements and speeches and references to NGO reports). On a single CD-ROM disk, users will have the contents of 60,000 pages of official documents, available for scanning and retrieval.

International Institute for Sustainable Development (IISD)

The IISD was established in 1990 by the Governments of Canada and Manitoba. The Institute is a private non-profit organization guided by an independent Board of Directors. The IISD's mandate is to promote sustainable development in decision making both in Canada and abroad. Its focus is two-fold: policy research and communications that will help move sustainable development from concept into practice. The Institute works through networks and partnerships and has four key program areas:

- Business and Government
- Trade and Investment
- Communications and Partnerships
- Poverty and Empowerment

The IISD is involved in UNCED follow-up through participation in research programs and involvement in the National Stakeholders process. In particular, the IISD is in the process of conducting an information survey of National Stakeholders' post UNCED activities. This information (and subsequent further information broader in scope) will ultimately be made available to all interested parties through an online information system currently under development accessible through PC modems.

The IISD recently published a report on Trade and Sustainable Development, and jointly sponsored a related seminar with UNCTAD and UNEP in December, 1992.

Canadian International Development Agency (CIDA)

CIDA established an Office of the Environmental Advisor in 1983, articulated an environment strategy in 1986, established a full-fledged Environment Sector in 1987, and adopted a "Policy for Environmental Sustainability" in support of its sustainable development mission statement in 1992.

CIDA committed a total of $1.32 billion to projects which have environment and development objectives consistent with Agenda 21 during the five fiscal years 1985/86 to 1990/91. These amounts represented about 10% of CIDA's budget.

In terms of Agenda 21 follow-up, CIDA proposes to conduct a thematic analysis of Agenda 21. To date, four themes (population, women, water and forests) have been analyzed. Dates for completion of the thematic analysis are not available at present.

CIDA also intends to continue to participate in the National Stakeholder process.

Inuit Circumpolar Conference (ICC)

The ICC is an international NGO of which the Canadian arm is but one of several. Specifically, the ICC represents some 115,000 Inuit in 8 circumpolar nations. Its mandate is to: promote Inuit rights and interests at the national and international levels; seek full and active partnership among Inuit in social, political and economic issues; and to develop and encourage long term policies that safeguard the Arctic environment.

The ICC was an active participant throughout the UNCED process, and overall the ICC was pleased with the progress made by indigenous peoples. Capitalizing on the advancements made by indigenous peoples as reflected in Agenda 21, particularly in the area of promoting the use and integration of Inuit ecological and environmental knowledge is now the ICC's main preoccupation.

Much work needs to be done in order for the ICC to develop internal policies and an action/implementation plan that realistically reflects the needs, capacities and objectives of the circumpolar regions. The ICC is also attempting to participate in all of domestic and international initiatives underway to analyze and implement Agenda 21. The ICC continues to be frustrated, however, by lack of adequate funding to implement its responsibilities.

National Round Table on Environment and Economy (NRTEE)

The NRTEE was established in 1988 and reports directly to the Prime Minister. To quote pending federal legislation, the NRTEE "is to play the role of catalyst in identifying, explaining and promoting, in all sectors of Canadian society and in all regions of Canada, principles and practices of sustainable development...". The NRTEE has declared that it will be an agent of change for sustainable development - by being a catalyst, partner, advisor, promoter, interpreter, contributor, researcher, and clearinghouse for information. In short, the NRTEE is a

multi-disciplinary, multijurisdictional, and multi-interest body that has but one mandate: to reconcile divergent interests to the primacy of sustainable development.

The round table movement is unique to Canada. It reaches across and includes representatives from all institutional lines - be they governmental, business, occupational, social, political, environmental, or regional - in order to encourage the flexibility of response necessary for the transition to a sustainable society. In particular, it seeks to identify more clearly the economic pathways to sustainable development. The NRTEE is only one of several round tables. There is also a round table for every province and territory, and at the municipal level there are more than a hundred round tables with additional ones continuing to be formed.

The NRTEE is also active in the National Stakeholders Process and, as such, is playing a role in defining Canada's current and future position vis à vis Agenda 21 implementation.

Environment Canada

An UNCED Task Group has recently been established within Environment Canada as a federal government focal point and information source on UNCED-related commitments and related Canadian responses. This Group will also act as a catalyst for integrating delivery on UNCED commitments into federal government business. Further details on the Group's operational specifications are presently under discussion.

Organizational Overviews - Multilateral

The Earth Council

The Earth Council is an independent global ombudsman established to review and report on the performance of governments and others in implementing the wide-ranging accords adopted at UNCED. It is intended that the Earth Council, (whose chairman is Canada's Maurice Strong) seek to cooperate with the Sustainable Development Commission and the scores of non-governmental organizations (NGOs) that are concerned with environment and development. Many of these organizations participated actively in the formation of the Earth Council. The Council will particularly attempt to link the concerns, interests and insights of people at the grassroots level with global policy and decision-making processes.

Organization for Economic Cooperation and Development (OECD)

The OECD has developed environmental indicators to help decision makers around the world develop strategies to promote sustainable development. At a meeting of OECD Environment Ministers in early 1991, a commitment was made to continue their development and systematic use. In addition, the OECD Trade and Environment Policy Committees, through a Joint Trade and Environment Experts Group, have been tasked to draw up guidelines on "ways to protect the environment and preserve the open multilateral (trading) system".

To date, OECD's response to UNCED has been a list of activities found in the 1993 OECD Work Program as relate to each chapter of Agenda 21. This provides an overall summary of OECD's contribution in the follow-up to UNCED. There is, however, a general consensus that the OECD can and should do more with regard to Agenda 21 implementation.

General Agreement on Tariffs and Trade (GATT)

GATT is a multilateral treaty established in 1947 to regulate multinational trade practices under the United Nations system. The treaty signatories undertook to conduct trade "with a view to raising standards of living, ensuring full employment and a large and steadily-growing volume of real income and effective demand, developing the full use of the resources of the world and expanding the production and exchange of goods".

As a result of the 1972 UN Conference on the Environment (the Stockholm Conference), GATT established the Working Group on Environmental Measures and International Trade, charged with analyzing the impacts of environmental regulations on trade flows. The Working Group did not actually convene until 1991. Among the Group's mandates is to determine what aspects of trade and environment issues can be appropriately addressed within existing GATT provisions. In view of the importance attached to trade in the achievement of Agenda 21 recommendations, the function of these provisions is of direct relevance. The objective of the Working Group is to ensure that GATT rules fully deal with the legitimate use of trade measures for environmental reasons. Specifically, the Working Group's agenda deals with 3 issues:

i) trade provisions in existing international environmental agreements (e.g., Montreal Protocol), the Convention on the International Trade in Endangered Species (CITES) and the Basel Convention on Hazardous Waste vis a vis GATT provisions and principles;
ii) multilateral transparency of national environmental regulations; and

iii) trade effects of packaging and labelling requirements aimed at protecting the environment.

Sustainable Development Commission (SDC)

The SDC was proposed at UNCED and formally adopted by the United Nations General Assembly (UNGA) in the fall of 1992. It reports to UNGA through the Economic and Social Council (ECOSOC). In brief, the SDC has been tasked with a monitoring role with respect to the international and national implementation of Agenda 21 and activities relating to the integration of environment and development goals throughout the United Nations system. The Conventions on Climate Change and Biodiversity and progress relating to the Forest Principles are included in these activities.

The SDC shall consist of 53 representatives of States elected as members with due regard to equitable geographical distribution. Canadian Ambassador for Environment and Sustainable Development, Mr. Arthur Campeau, was elected to the position of Vice-chair of the SDC and will so serve for one year beginning in April.

As of March 1993, the SDC intends to group Agenda 21 into thematic clusters, to develop a time-schedule for the review of these thematic clusters, and to provide the necessary guidance to enable this to be developed into a fully comprehensive document for consideration at the first substantive meeting of the Commission to be held from 14-25 June 1993.

United Nations Development Programme (UNDP)

UNDP is an organization of the United Nations linked to the General Assembly and to the Economic and Social Council (ECOSOC). UNDP assists developing countries in promoting human development and developing the capacity to manage their economies.

UNDP plays a leading role in coordinating the development efforts of the United Nations system. It has launched a Sustainable Development Network (SDN), which aims to link governmental, NGO, grassroots and entrepreneurial organizations which could benefit from and/or contribute to economic development that is environmentally and economically sustainable.

As an example of Canadian activities under the UNDP, Canada is involved in a three year pilot project to assist DCs prepare their own sustainable development plans. (Canada's contribution to this project is $2 million $8 million total). Details on how this project will be undertaken are still under review.

United Nations Environment Programme (UNEP)

UNEP was established in 1972 on the basis of the UN Conference on the Environment: the Stockholm Conference. The role of UNEP is to coordinate and stimulate environmental action within the UN system. This role is distinct from the UNDP and other development organizations which normally fund development activities directly.

Agenda 21 calls for strengthening of UNEP; Canada has agreed to double its annual contribution to UNEP from $1.1 million to $2.2 million.

Significant information programs coordinated by the UNEP include the Global Environmental Information Systems (GEMS), the International Environmental Information System (INFOTERRA), and the International Register of Potentially Toxic Chemicals.

World Bank

The World Bank has separated Agenda 21 into a number of themes, each of which is presently being examined. An annual report is planned which will describe the Bank's actions and plans with respect to these themes. The date at which the first report will be available is not yet known.

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