FOR EARTH'S SAKE

A REPORT FROM THE COMMISSION ON DEVELOPING COUNTRIES AND GLOBAL CHANGE

For Earth's Sake

Poverty, inequality, dependency: catalysts of the economic and social malaise of the Third World.

Global warming, ozone depletion, the vanishing rain forest: images of a planet-wide crisis in our environment.

Is there a connection? Can the key to rescuing our environment be found in the concerns of sustainable development?

The answer is *yes.*

Technical fixes are only patches. The real solution to the global environmental crisis lies in eradicating poverty and inequality. It lies in the effective transfer of appropriate knowledge systems and technologies. It lies in democratic decision-making.

Northern concerns dominate the environmental agenda. The voice of the South must be heard.

(continued on back flap)

For Earth's Sake

The Commission on Developing Countries and Global Change

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For Earth's Sake

A Report from the Commission on Developing Countries and Global Change

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
Ottawa • Cairo • Dakar • Montevideo • Nairobi • New Delhi • Singapore

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The views expressed herein are those of the author and do not necessarily reflect the views of the International Development Research Centre or the Swedish Agency for Resarch Cooperation with Developing Countries.

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Foreword

The decision to support and fund the Commission on Developing Countries and Global Change originated from a proposal developed in a series of meetings at the International Development Research Centre (IDRC) in Ottawa, Canada. The meetings had been convened to consider options for supporting developing countries in the Human Dimensions of Global Change Programme. Both this Programme and the International Geosphere Biosphere Programme (IGBP) were conceived in recognition of the implications of global warming and other environmental problems and of the need to study those problems and related responses on a global scale.

The initial efforts in IGBP made it largely a First and Second World "show." Little or no attention was given to the Third World. In the social studies, such an omission is totally unacceptable. Social sciences are inherently value-laden; both objectives and methods of research can vary widely among different cultures and societies. Fortunately, it has become increasingly recognized that Third World social scientists must not only participate in the growing volume of work related to global change but must also play a significant role in determining what that work should be.

The establishment of the Commission on Developing Countries and Global Change, with support from IDRC and the Swedish Agency for Research Cooperation with Developing Countries (SAREC), was based on three key propositions:

- Global environmental problems have potentially catastrophic implications for many developing countries;
- Support for the participation by developing countries in dealing with these problems is lagging behind recognition of the need for their participation; and
- The biggest gap in both understanding and participation, and thus the greatest need for research support, lies in the field of applied (both policy- and program-related) social sciences.

The work of the Commission was to emphasize social studies; however, by no means are all of the Commissioners strictly social scientists. Neither social nor natural sciences have a monopoly on wisdom, and the Commissioners have brought to this book an interesting balance between the two cultures. The Commission, as well as IDRC and SAREC, recognizes that it is essential to

invoke both the social and natural sciences and, while recognizing their profound differences, to help bring them together in a collaborative way.

The first meeting of the Commission took place on Earth Day 1991. This overlap was coincidental; however, it could be regarded as symbolic in at least two ways. First, the work of the Commission of course involves the issue that is implicit in Earth Day: the environmental well-being of our planet. Second, and less evident, is the fact that Earth Day is a Northern idea, a Northern product, that is being exported to the rest of the world — not to imply that Earth Day is inappropriate; however, it must also be viewed from an alternative Southern perspective.

This book offers such a perspective and proposes a uniquely Southern agenda for research into global environmental change. It rejects the idea that we can resolve our ecological problems by simple adjustments of the economic system — or, as an economist would say, "internalizing the externalities." Rather, it asserts that sustainable development requires more fundamental changes. The authors have dared to envision a different future. Even more importantly, they have proposed ways to reach this future that can simultaneously satisfy the demands of equity, economy, and ecology.

We congratulate the Commissioners: this report will both focus and stimulate debate on strategies and priorities for mitigating the effects of global change. Around the issues of environment and development, free and open communication between scientists and policymakers is essential. Both IDRC and SAREC look forward to, and will continue to participate in and stimulate, such dialogue, for the sake of the Earth.

Keith Bezanson
President
IDRC

Anders Wijkman
Director General
SAREC

Acknowledgments

The Commission on Developing Countries and Global Change was established with the support of IDRC and SAREC and is composed of seven social scientists and practioners representing Central and South America, East and West Africa, and South and Southeast Asia:

- Anil Agarwal *(India),*
- Julia Carabias *(Mexico),*
- Martin Khor Kok Peng *(Malaysia),*
- Adolfo Mascarenhas *(Tanzania),*
- Thandika Mkandawire *(Senegal),*
- Alvaro Soto *(Colombia),* and
- Erna Witoelar *(Indonesia).*

Coordination and intellectual support for the Commission was provided by a Secretariat located at, and generously supported by, the Royal Society of Canada in Ottawa, Canada. The Secretariat was headed by Alvaro Soto, as Executive Secretary to the Commission.

Rebecca Aird synthesized the written input and discussions of the Commissioners, and prepared the initial and final drafts of the report. To her, the Commission, and its sponsors, extend their deepest thanks.

The Commission worked together for almost a full year. It met for the first time in Ottawa, Canada, and subsequently in New Delhi, India, and Jakarta, Indonesia. The report is also the result of a wider consultative process carried out by the Commissioners in their respective regions. As such, it reflects the wide range of disciplines and viewpoints among social and natural scientists of the Third World.

The following participants attended the meeting on *Global Environmental Change: An Agenda for South Asian Social Scientists,* organized by the Centre for Science and Environment, New Delhi, India: from Bangladesh, Azizul Hoq Bhuiya; from India, Praful Bidwai, B.K. Roy Burman, Kamla Chowdhry, Ramchandra Guha, Sumit Guha, N.S. Jodha, Kailash Malhotra, Kuldip Mathur, Sudipto Mundle, Rajni Pairiwala, V.R. Panchmukhi, Vijay Pande, Jyoti Parikh, Shereen Ratnagar, Kalpana Sharma, Kumud Sharma, Chhatrapati Singh, K.S. Singh,

and A. Vaidyanathan; from Nepal, Deepak Bajracharya, Girish Chandra Regmi, and Jyoti Tuladhar; and from Pakistan, Pervaiz Hasan and Arif Hassan.

Held in Mexico City, and encompassing the region of Central America and the Caribbean, the *Taller Mexico, Centroamerica y el Caribe, Cambios Ambientales Globales, Elementos para la Elaboración de una Agenda de Investigación para las Ciencias Sociales* was attended by the following participants: from Costa Rica, Pascal O. Girot; from the Dominican Republic, Victor Hugo de Lancer; from Mexico, Lourdes Arizpe, Raul Garcia Barrios, Ana Iramis Batis, Rolando Garcia, Carlos Johnson, Omar Massera, Estela Martinez, Betsabe Miramontes, Maria de Jesus Ordoñez, Enrique Provencio, Gabriel Quadri, Fernando Tudela, and Araceli Vargas; from Panama, Salvador Arias Peñate; and from Puerto Rico, Ariel Lugo. The organizers of this workshop and the Commissioners extend special recognition to Enrique Provencio for his contribution to the discussion and elaboration of the written material.

In South America, the *Consulting Meeting of the Commission on Developing Countries and Global Change* was held in Montevideo, Uruguay, with the participation of Jorge F. Sábato (Argentina), Julián M. Chacel (Brazil), Joaquin Vial (Chile), Maria Clara Rueda (Colombia), Rodolfo Rendón B. (Ecuador), Efrain Gonzáles de Olarte (Peru), Roberto Bissio (Uruguay), Roberto Fernández (Uruguay), and Edi W. Juri (Uruguay).

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Prof. Salau, a Nigerian scholar and coordinator of the CODESRIA (Council for the Development of Economic and Social Research in Africa) network on the environment, prepared an annotated bibliography of key environmental literature from Anglophone West African countries. For this, the Commission is grateful.

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Finally, the Commission must acknowledge the contribution of the Human Dimensions of Global Change Programme. The reports from the two Programme workshops, held in Caracas, Venezuela, in 1989, and Dakar, Senegal, in 1990, and organized by the International Federation of Institutes for Advanced Study, greatly contributed to the discussions of the Commission.

Introduction

The work of the Commission on Developing Countries and Global Change was based on the acceptance by the Commissioners and the sponsoring organizations (IDRC and SAREC) of three key propositions:

1. Global environmental problems have potentially catastrophic implications for many developing countries;
2. Third World perspectives must be integrated into the international agenda on global environmental change; and
3. The social dimensions of these issues must be understood and resolved.

The Commission was to suggest options for increasing the understanding of social dimensions of global change. It was to examine what could be done to enhance the relevance of research on global change in relation to the needs and interests of Third World countries. The particular aims of the Commission were

- To present an alternative Southern perspective on global environmental and social issues;
- To propose elements of a more sustainable and equitable world order;
- To identify the most important social dimensions of environmental change in Third World countries;
- To present a research agenda that will reflect these priority issues;
- To recommend ways that existing research capacity in the Third World can be brought to bear on the problems of global environmental change; and
- To identify ways to strengthen research capacity in relation to these issues.

Broadly, the principal goal of the Commission was to raise the profile of Southern environment/development perspectives and concerns within the research community worldwide.

The intended audience for this book is not limited to social scientists. It is hoped that the work will contribute to an interest in, and commitment to, the social studies among a wide range of researchers and activists in environmental and developmental issues. There is need not only for social science research on

environmental issues but also for the integration of social dimensions within environmental research. For this reason, in dealing with questions of research, reference to social scientists is generally avoided. Instead, the discussion focuses on the subject matter — social science research on environment/development issues — and the investigators are referred to as researchers on social issues.

The Process

This report was produced over a 10-month period through an iterative and consensual process of group discussions and debate, synthesis of written input, and collective review. The seven Commissioners met for the first time in Ottawa, Canada, in April of 1991. At this first meeting, the Commission established a preliminary outline of the report and a work plan. The Commissioners then returned to their home regions to consult with other environment/development researchers and decision-makers. Thus, the thinking of each Commissioner was informed by generous contributions from colleagues in each region. Written input from individual Commissioners was then synthesized. At the second meeting — held from 26 October to 8 November 1991 in New Delhi, India — key issues were reviewed and discussed in detail. These issues arose partly from the written material and partly from the spontaneous creativity of open debate. Based on this meeting, a draft report was prepared. The third meeting was held from 11 to 15 January 1992, in Jakarta, Indonesia. At this last meeting of the Commission, the report was finalized.

Central America and the Caribbean

For consultation in Mexico, Central America, and the Caribbean, a 3-day workshop was organized. Workshop participants included researchers from Costa Rica, the Dominican Republic, Mexico, Panama, and Puerto Rico. Many of the participants had also worked in other Central American countries, including El Salvador and Guatemala. The participants were organized into three working groups. The first group discussed global environmental change in general. They worked on understanding the differing perspectives and their effect on problem definition, and defined an analytical framework. The second group worked on a methodology for analyzing environmental problems. The third

group identified broad research themes, intending to define those themes that encourage an integrative approach to investigation and understanding.

South America

The South American input evolved from a meeting in Montevideo, Uruguay. Participants included environmental and social researchers from Argentina, Brazil, Chile, Colombia, Ecuador, Peru, and Uruguay, as well as representatives of two key economic and policy institutes in Chile and Colombia.

Africa

The two Commissioners from Africa divided their responsibilities between West Africa, and Eastern and Southern Africa. For West Africa, several existing projects of CODESRIA were sources of relevant input. These included two recent CODESRIA conferences: one on environmental research capacity in Francophone Africa and another on gendering social science research in Africa, in which environment was a specific subtheme. Also used were materials from a conference jointly organized by CODESRIA and the Social Science Research Council in New York: *Whose Knowledge Counts: Relations Between Formal and Informal Institutions and Research Users.* An annotated bibliography on key environmental literature from Anglophone West African countries was commissioned; the CODESRIA document unit did an extensive bibliographic search on environmental issues and activities; and personal interviews were conducted with researchers working on environmental issues.

In Eastern and Southern Africa, insights into the regional problems and opportunities were garnered through personal experience in a variety of organizations and projects. These included an environmental research organization; an international nongovernmental organization (NGO); various research efforts organized by the United Nations Research Institute for Social Development (UNRISD), especially on the social dynamics of deforestation; and an overview for the United Nations Development Programme (UNDP) of NGOs involved in environment and development in Tanzania, Uganda, and Zambia. In addition, regional colleagues from a range of institutions shared information and perspectives, as did officials from various countries.

South Asia

A 1-day workshop on global environmental change was organized with social scientists and activists invited from Bangladesh, India, Nepal, and Pakistan. The seminar dealt with environmental issues cutting across the disciplines of economics, sociology and anthropology, history, women's studies, and political and legal sciences. An extensive annotated bibliography of South Asian social science research was also prepared, and the overall directions of social science research with respect to the environment were analyzed.

Southeast Asia

In Southeast Asia, a combination of general questionnaires (sent to 140 organizations) and in-depth personal interviews were used to solicit input from environmental and developmental NGOs, research institutes, independent researchers, and community workers. The region's two Commissioners and their research assistants participated in many regional workshops on the environment/development theme of the Commission. These workshops primarily involved researchers and community NGO leaders. They were asked to explain the social issues associated with environmental change that they considered most important. The Commissioners also participated in preparatory meetings for UNCED, the United Nations Conference on Environment and Development. These meetings provided an opportunity to gather opinions from a cross-section of Third World participants on global environment/development issues.

Outline of the Report

The Commission's final report, presented in this book, consists of three major parts. Part I provides a Southern perspective on the global environment/development crisis and on the global and national-level causes of this crisis. The elements of an equitable approach to sustainability are proposed, forming the foundation of a research agenda. Part II looks at the roles, problems, and potential of social research in relation to environment/development issues, including challenges specific to the South. Part III presents the research agenda itself, addressing the basic principles to guide environment/development research, the specific research topics, and the institutional and training requirements that would emerge from the identified research needs.

Terminology

North/South

A key language question is how to divide the nations of the world into two categories. The exercise is by definition unreasonable: no two categories could possibly offer an informative or sensitive method of defining such a complex collection. Nonetheless, some such distinction is not only valid but also crucial; this is clear from the history of attempts to make it.

The complex, loaded, and often ambiguous set of differences on which the distinction has historically been based relates in part to material wealth, degree of industrial and technological development, political history, culture, and location! Thus, variously used pairs include rich/poor, developed/developing, industrialized/nonindustrialized, First World/Third World, and North/South. Although far from completely satisfactory, the Commission favours the final two pairs, in particular, North/South. The alternatives are to varying degrees inappropriate, obsolete, or pejorative. For example, the rich/poor distinction does focus on one valid difference; however, because this terminology can neither reflect the nature of inequitable relations between South and North, nor the structural differences between countries, it leaves the impression that these differences are the result of random chance. Moreover, the classification tends to be based strictly on per-capita income, not accounting for other aspects of wealth.

The developed/developing terminology is also unacceptable. This pair implicitly assumes that "development" is strictly a function of income levels and technoindustrial complexity. Surely, considerations such as cultural richness and ethical maturity should rate at least as highly in determining whether a nation is "developed." A focus strictly on the level of industrialization overlooks more critical determinants of quality of life, not to mention the economic, cultural, and environmental implications of industrialization. Moreover, as many countries of the South are now heavily industrialized, categorization based on this factor is no longer relevant. In any case, the complexity of international relations in an increasingly globalized economy, and the development of regional trading blocs, have made obsolete classifications that are based on dependency models and centre–periphery relations.

Despite the fact that the North/South terminology also has its limitations, among which is the fact that some countries with high income levels are situated in the South, it is adequate for our purposes. The perspectives on the causes and consequences of global change presented in this report correspond to that of most countries in the South, and the environmental and developmental conditions of these countries are clearly distinct from those of the North. In addition, the problems of development, in terms of the most critical features, are shared by virtually all countries of the South.

The term Third World is also used in this report. This term developed from the felt need of nonaligned countries to distance themselves from the prevailing division of the world into capitalistic (First World) and socialistic (Second World) blocs. The classification has now lost some of its original context, and it has been some time since the terms have been interpreted on the basis of political nonalignment. Rather, the distinction implies a similar set of characteristics as "developing," but is not as biased.

"Global" Change

The report, in Chapter 1, offers an alternative perspective on the use of "global" as an adjective to qualify environmental issues. However, because of the prevailing connotations it now possesses, we have consciously minimized use of the world "global" in the context of environmental change. The Northern-based division of environmental problems into two categories — global and local — has left the South holding exclusive responsibility for "local" problems. Many in the South believe that this division is artificial; it denies and hides the international dimensions of many so-called local problems.

Environment/Development

Finally, in using the term "environment" we refer to the biophysical environment, including human relationships with, and dependencies on, this environment. Humans, like other species, participate in determining the biophysical environment. Past distinctions between the natural and human environments reflect the conceptual dissociation from nature that has contributed to the current crisis. Many traditional cultures, such as those of the Amazon, see the environment as a lived reality, a habitat, which

has to be used on a sustainable basis. For the outsider, the Amazon is a "wilderness" that must be exploited or transformed for profit or, at best, conserved in its natural state.

The concept of "development" encompasses a broad set of economic, social, cultural, and political conditions and relations, reflecting human–nature and human–human interactions. Our primary focus in this book is on the dimensions of the development crisis that both shape and reflect the environmental crisis. In addressing this subject, we have used the term "environment/development" crisis.

Perspectives of the Commission

Within the last decade, the linking of environment and development issues, and the acknowledgement of this linkage on the world stage, has been encouraging. At the same time, however, this apparent progress has been undermined by an evolving world order increasingly dominated by market economics. Noneconomic values and moral concerns (in particular, equity and ecology) are seen as extraneous or, at least, too impractical to address. Now, as the world environmental agenda is being developed, the Commission believes that it is essential that the linkage between environment, development, and equity be made fully meaningful. Profound changes are needed in development models, lifestyles, and economic and political relationships. We hope that the analysis and perspectives presented here contribute to this goal.

An enhanced understanding about the particular perspectives and concerns of the South in relation to environmental change is essential. Indeed, Southern thinking must be clearly integrated into the global agenda on environment/development issues — an agenda that is now dominated by the North. Similarly, partly as a function of financial clout, Northern perspectives also dominate the research of both development and the environment. Southern scholars and scientists have not adequately considered their research directions or priorities. Indeed, many in the South are unaware of the degree to which the perspectives and approaches that dominate environment/development research and debate are not of their own making. Research efforts are therefore strongly influenced by a distorted, unilateral image of

Southern problems. Such research has often helped to entrench inaccurate, detrimental stereotypes and has done little to alleviate basic problems such as poverty, lack of democracy, and resource degradation.

The global environmental issues considered in the North to be most pressing are not necessarily priorities for the South. Likewise, Southern environmental priorities, which tend to centre on immediate problems related to basic human needs, are under-represented on the global environmental agenda. Issues such as global warming and the loss of biological diversity have little meaning for people suffering the day-to-day consequences of starvation, malnutrition, or lack of basic health care.

Clearly, there are not only two opposing visions of environment/development issues: South versus North. Rather there are many views within both South and North; indeed, many peoples of the South and North hold similar views. For example, many public interest groups in both the South and the North believe that the inequities, high consumption, and wasteful production systems that benefit a minority of humanity are neither sustainable nor socially justifiable. At the heart of these issues, however, there are clear differences between South and North, and it is crucial that Southern interests be recognized and acknowledged as a basis for understanding and action.

PART I

Reframing the Debate: A Southern Perspective on the Global Environmental Crisis

CHAPTER 1

Understanding the Environment/Development Crisis: Back to Basics

The world today is characterized by unacceptably sharp differences between the poor and the opulent, the hungry and the overfed, the powerful and the powerless. The 20th century saw an unprecedented increase in overall economic output: however, simultaneously, it also saw extreme social and economic human inequality. The world's population has more than tripled since 1900. At the same time, the gross world product has increased 21 times, the consumption of fossil fuels 30 times, and industrial production 50 times. This enormous increase in wealth has not benefited all people equitably. The average income of the richest one billion people is 20 times larger than that of the poorest billion.

Most parts of the Third World are facing a severe economic and social crisis. Notwithstanding the apparent promise of development, throughout the 1980s, the increasing severity of socio-economic conditions was undeniable. Not only did existing development problems continue, but also the poor countries faced declining rates of expansion in production (see Box 1). Asymmetries between the South and the North have become even more pronounced. In some regions and countries, per-capita incomes have declined to the level of 20 or 30 years ago. Poverty, along with its social, environmental, and human implications, has increased.

At the same time, the environment worldwide is in crisis. At local, regional, and global levels, key features and processes of the natural world are being damaged or obliterated. Even though human societies have, since their earliest origins, affected many kinds of environmental transformation in the course of development, nothing compares to the changes that have been wrought in recent decades. Consequent awareness of critical environmental issues — atmospheric change, water pollution, unsustainable exploitation of renewable resources, deforestation, erosion, degraded carrying capacity, loss of biological diversity — has now extended well beyond academic circles into the central arena of public debate.

Box 1

Failing Hopes: Examples of Reduced Growth and Increased Dependency in the South

In sub-Saharan Africa, per-capita income declined by 12 percent from 1980 to 1989. However, this average conceals even greater declines in many countries. In Uganda for instance, per-capita income declined 28 percent; in Niger, 24 percent; and in Zambia, 20 percent. Some of the most adversely affected countries are also among the poorest countries.

In Latin America and the Caribbean, per-capita gross national product (GNP) declined by 9.6 percent from 1981 to 1990. In Central America, the decline in per-capita GNP reached 17.2 percent. In this period, Latin America and the Caribbean sent net transfers of 212 billion United States dollars to creditors. The fact that the payments were to creditors from the First World eloqently expresses a critical dimension of the relationships of deepening dependency. Meanwhile, the number of poor in Latin America increased by 40 million, representing 43 percent of the population in 1986; in 1980, this figure was 41 percent. More integral measurements indicate that by 1990, poverty affected 62 percent of the population of Latin America and the Caribbean.

In many cases, the socioeconomic crisis is the result of development styles that destroy both human potentials and the environment. In fact, the two phenomena — the global environmental crisis and socioeconomic decline in the South — are the result of unsustainable systems of production and consumption in the North, inappropriate development models in the South, and a fundamentally inequitable world order. South–North relations are based on gross overexploitation of, and underpayment for, Southern resources and human labour. The competitive forces that make economic growth a necessity, operating within this imbalanced global political economy, have led to uneven, distorted development and levels of resource and environmental degradation that threaten life and the future of humanity itself. Within many countries of the South, these same kinds of relationships between environmental degradation and extreme poverty hold. In sum, through inappropriate production processes and technologies, the Earth's resources are being exhausted and polluted at an accelerating rate. An ever-increasing volume of

goods and services are being produced, the majority of which are channeled toward filling the consumption demands of a minority, leaving the basic human needs of the poorer majority unmet.

From a Third World perspective, the development crisis and the environmental crisis in fact constitute a single social–ecological crisis — the most pressing challenge of our times. If current trends are not reversed, there will be ever scarcer resources to meet the demands of current and future generations of humanity, productive capacities will diminish, and the poverty levels of the peoples of the South will worsen.

An Evolutionary Overview

The state of the biophysical environment and the natural resource base in any particular region is the result of complex interactions between local ecosystems and human activities. The latter is conditioned by economic systems and conditions, social and cultural processes, the political order, legal and administrative systems, and the kinds of technologies in use.

No society's relationship with nature is static. Interactions change over time, and major shifts mark new historical phases. But historically, through an ongoing and gradual process of learning and adjustment, many cultures have adopted modes of self-reproduction and ways of interacting with nature that were sustainable. Over generations, new practices were selected and adopted; those that could not be sustained were abandoned. Such cultures coded the "dos" and "don'ts" into patterns of everyday life, forming a powerful body of indigenous knowledge that was evident in many forms of ecologically sound production in agriculture, fisheries, water management, and other sectors. These indigenous mechanisms were often disrupted by unforseen natural catastrophes and invasions by foreign cultures. In some cases, populations moved to unfamiliar natural environments, disrupting systems of social organization that had evolved to a particular natural environment. In general, however, lifestyles, values, demographic pressures, and levels of technology were such that environmental burdens were minimized.

It was not until modern-day colonialism that there were ruptures on a global scale to the sociocultural mechanisms behind sustainable livelihoods. Traditional knowledge and

resource-management systems were disregarded by the new rulers. The colonial powers wanted to acquire the wealth generated by the careful management of local environments or appropriate the land for production of goods for European markets. They did not, however, understand these environments or the rationale for, and systems of, traditional management (see Box 2).

The natural resources of the colonized territories were exploited and exported as raw materials, while imported products began to flood their markets. The local populations, steadily losing control over their resource base, became increasingly alienated. What were once community-managed commons steadily turned into state resources, whose purpose was mainly to benefit commercial interests.

As a general trend, environmental degradation became widespread with increasingly intense commercialization of the economy. As forests disappeared in parts of Africa and India, for example, firewood became scarce. As the availability of fodder declined, grasslands were severely overstocked and their productivity began to collapse. As erosion increased, once fertile land became wasteland. The scarcity of biomass engendered an acute human crisis. Women suffered the most, as the daily tasks of collecting fodder, wood, and water became more and more onerous. Children, especially girls, were increasingly required to work alongside their mothers to support the family.

In Africa and Asia, where independence was achieved in relatively recent history, a class of peoples educated by the colonizers, and no longer understanding or appreciating traditional ways, became leaders of the nations of the Third World. The result has been a deepening of the Westernization process. In the end, the colonization of the resource base appears easier to reverse than the colonization of the mind.

Similarly, in Latin America, where independence was won earlier than in Africa and Asia, the end of colonialism did not at first involve major changes. Production processes remained much the same as those that existed during the colonial period. The production of raw materials for export continued, with control now concentrated in a new elite who had become owners of the land. However, important changes in modes of production did occur with the agrarian reform — the result of armed revolution in

Box 2

The Economic–Ecological System of Traditional India

Farmers living in India's semi-arid lands, recognizing the risks of settled agriculture in an area with heavy weather fluctuations, traditionally adopted sustainable and risk-minimizing techniques. Indian villagers transformed their environment into a complex ecosystem of croplands, grasslands, and forests — an interactive, multipurpose biological system that responded to the seasonal rhythms of the area and minimized the social and economic impact of rainfall variation. Farmlands produced grains to feed people, and the crop residues fed farm animals; livestock provided not only milk but also manure and draught power; grasslands provided green fodder during the wet season; forests and trees provided firewood and leaf fodder during the dry season. Because the land was parched for most of the year, many water-storage devices were developed across the country. Indians thus became some of the world's greatest water harvesters — when the British landed, there were already hundreds of thousands of water tanks across India.

This system of production was supported by an elaborate arrangement of property rights and religious practices. Not only the cow but also the grazing lands were sacred. Many forests were also set aside as sacred groves, while the ponds themselves and their catchments also had religious significance.

The wealth generated in villages, through self-reliance and careful management of the local natural resource base, supported a range of skilled artisans producing a great variety of renowned and widely traded goods. Major cities sprang up along the Ganges River and elsewhere. Even the desert supported wealthy cities. Thus, before the British came, India was one of the wealthiest and most urbanized countries in the world, nearly totally literate. But the British failed to understand the Indian concept of community property management. As the community lands yielded to the state, the colonizing British disregarded their functions within the local village ecosystems and considered them wastelands. They became state property managed by a bureaucracy; the ensuing process was tantamount to systematic, state-sponsored destruction.

The entire economic–ecological system of India was turned on its head to produce goods for the metropolitan markets in the colonizing nation. Old Indian cities along the Ganges and elsewhere, dependent on the evolved urban–rural links, were pauperized; cities became steadily deurbanized; artisans went bankrupt and were pushed into the countryside; and the incidence of illiteracy, poverty, and famine

grew greatly. Even today, most of the old Indian cities remain extremely poor. Within the hierarchy of urban systems, their place of primacy has been usurped by coastal metropolises like Bombay, Calcutta, and Madras, which did not even exist two centuries ago. These cities emerged and prospered as the Indian hinterland and its resources became linked to, and drained by, an external economy. Indian society and environment imploded under this colossal impact.

Mexico — and other agrarian transformations in Latin America. In most countries, national constitutions incorporated the demands of the poorest, and access to land was recovered by indigenous and campesino communities. To a large degree, the traditional knowledge of these communities was again applied. Ultimately, however, the lack of consistency in agrarian policy, the lack of real participation by rural people, and changes in the international order after the Second World War have resulted in the subservience of rural policies to industrialization.

Accordingly, colonial trade patterns — involving export of cheap raw materials and import of industrial products — have dominated the economies of most Southern nations since the Second World War. In addition and throughout this period, multilateral financial, technical, and aid agencies have promoted the replacement of local production practices in the South with technologies that are often environmentally damaging.

Recent decades have seen a further shift of resource control from local communities to centralized, commercial institutions. Community management and discipline in the use of natural resources declined further. Government loans and support have promoted further changes in rural production toward satisfying urban demands. As the monoculture of the Green Revolution began to take over, the genetic diversity on farms declined rapidly. Forests were sacrificed to meet urban and industrial needs. Unplanned and indiscriminate industrialization resulted in the proliferation of slums, pollution, and health hazards. The highly capital- and resource-intensive urbanization systems of the industrial powers, transplanted into impoverished economies, produced further disparities and inequalities. The gulf between the "haves" and "have-nots" widened and, as the "haves" captured increasing quantities of natural resources, environmental destruction wreaked further havoc on the "have-nots." Thus, a dual

society has flourished in almost all countries of the South, with the gap between rich and poor growing simultaneously with environmental destruction and the erosion of community rights over the resource base.

In response to the social injustice associated with environmental destruction, protests began to emerge in the Third World during the 1970s and 1980s. These protests — for example, the Chipko Movement (the famous hug-the-tree movement) in the Garhwal Himalaya of India and the Set Setal urban youth movement in Senegal — signal the beginning of a rise in consciousness in the South.

Differing Perspectives on Key Issues

To date, the South has had little influence in defining the key issues in the global environmental debate. As a result, issues of world poverty and inequity have become isolated from, and overshadowed by, global environmental concerns. Thus, although the environmental crisis has begun to force some changes in production and consumption, the bearing of these changes on critical socioeconomic and political conditions has been largely incidental and, at times, negative (see Box 3).

A new context is needed for the global environment/development debate. It must define basic concepts, such as sustainability and the "global" environment, and basic issues, such as burden sharing and population. These questions are explored here. The framework used to develop the research agenda (presented in Part III) takes the alternative perspectives presented here as a point of departure.

Approaching Sustainability: Choosing Priorities

To date, Northern concerns have directed the global environmental debate. These concerns reflect a definition of sustainability in which the physical environment is the primary focus and long-term intergenerational issues are key. Thus, primary moral obligations have to do with maintaining the options and interests of future generations. A critical message from virtually all quarters of the South is that social concerns, economic issues, and intra-generational equity — the very obvious "here and now" disparities in wealth and opportunities — are the keys to resolving the

Box 3

Costs of Dealing with the Costs of Pollution: An Example of Socioeconomic Fallout from Environmental Action

As one example of the often subtle socioeconomic implications of adaptations made to accommodate environmental concerns, to the extent that price adjustments to reflect environmental costs are being made by the North, the unintended effect is to contribute even further to North–South disparities. Because their economic base lies mainly in industrial production, environmental costs of production in many Northern countries are primarily associated with pollution. These costs are being steadily integrated into the price of goods as a result of public policies to control pollution; the costs being determined by the price of the control technologies.

Integrating the costs of land and resource degradation, the forms of degradation more commonly associated with the primary production economy of the South, is a much more complex matter. Firstly, the costs of rectifying these problems are more difficult to determine. Secondly, the prices of many Southern commodities are largely determined by monopolistic, transnational corporations. Thus, the Southern producers are "price-takers" and have to date been unable to collaborate in rationalizing supplies. Many Southern commodities also face stiff competition from substitutes.

The North is increasingly building into the price of its products — including the products it sells to the South — the expenditures it makes to control environmental degradation associated with pollution. However, there is nothing being built into the price of commodities shipped by the South to the North that reflects the associated costs of environmental degradation. Indeed, the terms of trade of several of these commodities have been consistently declining. The need to consider how the treatment of externalities can be equalized in internationally traded goods is but one small example of the kinds of factors that must be introduced to environmental decision-making.

environment/development crisis. Behind this message lies the notion of people-centred development. It is hardly surprising that the South is skeptical of the primacy given to issues such as atmospheric change within the "global" agenda. In the South, even the basic needs of a large proportion of the population are not being met, and economic and environmental priorities are largely ignored.

For example, the Global Environment Fund (GEF), sponsored by UNDP, the United Nations Environment Programme (UNEP), and the World Bank, finances projects that aim to prevent global warming, preserve biodiversity, reduce threats to the ozone layer, and control the pollution of international waters. These issues were selected by donor governments; they do not reflect the most pressing environmental problems of the Southern, recipient countries. Southern priority problems such as desertification and lack of clean drinking water could, for instance, have been included in the GEF. In comparison to funding for GEF projects, UNEP's anti-desertification fund has received almost no financial support, although it was set up in the late 1970s.

Moreover, given the Northern focus on the biophysical dimension of environmental change, analysis is done primarily within the natural sciences, and the topics that dominate the international agenda and dictate funding priorities are constrained by narrowly scientific perspectives. In comparison, key social dimensions of change are given relatively little attention.

Perhaps most disturbing is the sense that neither equity nor the environment itself are the concerns that underlie the recent Northern interest in "sustainable development." Rather, primary concerns continue to lie in sustaining Northern consumption levels and maintaining the conditions necessary for economic growth. Notwithstanding growing skepticism about the adequacy of the "techno-fix" approach, the associated position is that ecological problems can be technologically controlled in a market system, provided only that some adjustments are made to ensure that prices include environmental externalities. Even the depletion of natural resources is not viewed as a fundamental problem — it is assumed that new technologies will allow for continuous substitution. (Although there are fears that the growing Southern population and its increasing resource demands will mean less for the North and for future generations.)

In contrast, the environmental priorities of the South are underpinned by grim and undeniable human realities. In many countries of the South, environmental issues are issues of life and death. And, conversely, where poverty is widespread, lack of development may be a greater barrier to a reasonable quality of life than would the environmental impacts associated with current forms of development.

It is critical to any meaningful approach to "sustainable development" that environmental issues be integrated with issues of equity, social justice, human rights, and development. Fundamentally, the main cause of the environment/development crisis is unsustainable forms and levels of production and consumption in the North and their export to the South. It follows that, to resolve the crisis, more than technological approaches are required. Unsustainable output and expenditure levels in the North must be reduced, and socially and environmentally inappropriate development systems in the South must be reformed. A more equitable international order must therefore accompany the shift to more ecological and equitable national development. At the same time, constant attention must be given to the development implications of environmental decisions.

The Nature of "Global"

Selective and sectoral environmental issues now dominate the international environmental debate. It is clear that many players in this debate do not give "global" status to critical environmental problems that represent massive impediments to national and regional development and environmental quality in the South. These players, including many Northern governments, wish to separate out from the global agenda those environmental problems that manifest themselves locally and regionally, thus limiting responsibility for these problems to the national level. As a result, the current international agenda sidesteps the systemic international causes of environmental degradation. There is an apparent desire, at least at the official level, to avoid any serious discussion of the restructuring of international economic relations. The ethic of caring and sharing is far from prominent in the arena of international environmental debate.

Concretely, key Northern concerns focus primarily on long-term impacts involving selected, planetary-level, geophysical variables (ozone depletion, climate change). In the South, the most immediate and pressing environmental problems relate to the depletion and degradation of the biomass base, on which the majority of the population continues to be directly dependent. Indeed, as a large proportion of industrial output from the South is biomass based, economic activity in all sectors is threatened. An additional priority is the pollution, contamination, and resulting health

impacts associated with inadequately controlled industrial development and misapplications of chemical technologies.

The land, resource, and health issues that preoccupy the South are as global in nature as those espoused by the North. The South's priorities must be reflected in the international agenda as global issues. The roots of many ecological problems, regardless of the scale at which they manifest themselves, can be traced not only to local and national factors but also to the global system within which nations operate. Thus, the definition of "global" in the context of environmental problems must include the following elements:

- Problems that are geographically widespread in effect;
- Problems whose causes may be local or national, but whose effects are transboundary;
- Problems that are local or national in scale, but recur within many regions; and
- Problems that reflect international economic and political dynamics (for instance, policies and practices of international agencies and transnational corporations).

Defining the Global Commons

The North tends to frame many of its environmental concerns within the context of the "global commons." Until recently, the concept of global commons has been primarily reserved for those regions or resources over which no individual or state ownership could be claimed: in particular, the atmosphere, the open oceans, Antarctica, and outer space. In the absence of such ownership, the overuse and abuse of the area or resource is deemed to be inevitable (see Box 4). Indeed, these global commons all currently suffer to varying degrees the negative effects of exploitation, pollution, and mismanagement by various nations, and all have been the subject of proposed treaties or international agreements for cooperative management. In some cases, treaties have been set forth to allocate ownership and distribution of resources.

Now, however, other environmental regions and features are being increasingly perceived as global resources, even though ownership, or at least potential control over ownership, is vested in particular nation states. Regions that are, in some quarters, being newly proclaimed as global commons include tropical rain

Box 4

The Commons: Collective Ownership or "No-Man's-Land"?

In Western tradition, "the commons" are areas or resources for which no formal and exclusive ownership exists. An alternative perspective, common to many indigenous societies worldwide, is to view the commons as subject to a form of collective ownership, in which members of the collective share both benefits and responsibilities. In other words, the commons are managed through equality in access and community discipline. The implications of this latter approach are very different from the "overuse and abuse" implications of the Western commons. Many forms of traditional collective land ownership — for example, the *bona* of Iran, the *zanjera* of the Philippines, the *acadia* of West Africa, and the common pastures of England — are managed and maintained to the good of the entire community and future generations. Social traditions, rather than legal arrangements, are usually key to communal maintenance of the quality and carrying capacity of the land. Given the prevailing balance of political and economic power, the danger is that the Western perception of common property will largely determine current debate on management of the global commons.

forests. Their status as a global resource is supported by claims to the effect that they are "the lungs of the world" and repositories of a significant proportion of the planet's biological richness.

Indeed, many of the planet's richest sources of biodiversity are found in some of the world's poorest nations. Given current rates of species extinction, there is increasing pressure from the North (most particularly, agribusiness and pharmaceutical interests) to have Third World genetic resources designated a universal heritage — a sort of nonterritorial global commons. Ironically, the loss of biodiversity in many of these areas has often come at the hands of technologies (such as the Green Revolution) and forms of exploitation promoted by the North, at the expense of indigenous practices that helped sustain genetic diversity.

We cannot deny the local and global importance of biodiversity. However, efforts to extend the concept of global commons to nationally based resources are a threat to Southern sovereignty over Southern resources and, consequently, to the rights of the Third World to benefit economically from endemic resources.

Given that Northern countries are unlikely to consider their natural resources in this light, the message from the North reads "What's mine is mine, and what's yours is ours."

Burden Sharing

Although the economic debt of the Third World has received abundant attention, the environmental debt of the North has been greatly underplayed. Conversely, the substantial contributions of many peoples of the Third World, and of the poor in general, in conserving their environment are seldom acknowledged in the international arena. For example, the work of north Indian and Nepalese farmers in terracing mountains to conserve soil is an enormous labour investment in environmental sustainability that has rarely been acknowledged.

The North bears primary responsibility for many of the problems currently on the agenda of the global environmental debate. It is the South, however, that is likely to experience greater hardships as a result of these problems (see Box 5). Moreover, just as poor countries have borne the brunt of the global economic crisis, the perception is that sacrifices believed to be necessary in the pursuit of sustainable development will also fall unfairly on the poor countries. There is a fear that development efforts will be made more costly by environmental measures imposed by international regulations. Indeed, current perceptions about the causes of, and solutions to, environmental degradation may, intentionally or not, foster international actions and decisions whose effect is to arrest development in the South. This would lead to a hardening of current global inequalities. As well, in addition to the fact that many resources taken from Third World countries are given little economic value, many natural resources (in particular, genetic resources) taken from the South are altered and sold back to Third World countries at high prices.

The issue of how the burden of adjustment will be distributed is critical to any meaningful global environmental negotiations. Elements of an approach to addressing this issue are proposed in Chapter 3. But, for now, it is important to recognize that international environmental conventions already adopted or currently being considered have significant economic and political implications for countries of the Third World. While the South would like to fully participate in global environmental

Box 5

Atmospheric Change: Distribution of Responsibilities and Burdens

One global manifestation of the environmental crisis is the so-called greenhouse effect: alterations in the thermal balance through increasing concentrations of gases (such as carbon dioxide and methane) that trap radiation close to the earth's surface. This phenomenon is related primarily to the increased combustion of fossil fuels and biomass, and the massive loss of the earth's cover, which absorbs carbon dioxide, as well as some agricultural and animal breeding activities. It is conservatively estimated that by the middle of the next century the planet will experience increases of between 1.5 and 2.8 Celsius degrees, resulting in the highest temperatures in 120 000 years.

Through rising sea levels, global warming will result in the flooding of low-lying coastal areas. Thus, coastal populations will be affected. Changes in the monsoon winds are likely to bring floods in some cases and drought in others. In general, altered water cycles are likely to significantly affect agricultural patterns and potentials. Changes in sea currents are likely to result in damaging weather patterns such as cyclones.

All countries of the world do not contribute equally to the anthropogenic emission of greenhouse gases into the atmosphere; many countries of the industrialized North are among the largest contributors. The human repercussions associated with climate change will also vary considerably between different regions, but the distribution of these impacts bears no cause–effect relation to relative responsibility for global warming. Whereas the physical consequences of global warming — increase in sea level, droughts, cyclones, and changes in the hydrological cycles — will occur in countries of both the North and South, the capacity of First World nations to face these consequences is much greater. They are in a much better position to invest in the infrastructure (dikes, dams, wells, etc.), technological innovations, and technical capacity that will be required. Thus, the most vulnerable peoples are those in nations that have little economic and technical capacity for facing change.

Similar dynamics prevail in another environmental problem currently on the global agenda: the thinning of the ozone layer. This thinning is caused by the accumulation in the atmosphere of chlorofluorocarbons, chemical residuals from aerosols, refrigeration systems, and air conditioning. Penetrating through the depleted ozone layer, increased ultraviolet radiation stands to affect key primary producers, as well the health of more complex organisms, including humans. Again, the primary purveyors of the problem are the nations of the North, but the greatest burdens stand to be borne in the South.

management, a fair system of global environmental governance, built on the principle of equal human rights, is essential. We must be watchful for political biases in interpreting relative responsibility for environmental problems. Such interpretations are based on what is depicted as hard scientific fact; in fact, the data are often inadequate and open to various and frequently contradictory interpretations (see Box 6).

Perspectives on Population

Population is a major issue in the environment/development debate, with differing perspectives on its role in the current crisis. One mainstream view is that the large population of many Third World countries is a major (even the main) cause of poverty, resource depletion, and environmental degradation; population control is therefore seen as crucial to resolving the environment crisis. A key component in this argument is that in the sheer struggle to survive, large numbers of poor people destroy forests, harvest in excess of sustainable yield, cause soil erosion, and, in general, put tremendous stress on environmental carrying capacity.

Such a view is too simplistic. Relationships between humans and their environment are not fatalistic; they reflect cultural, economic, and technological factors that are potentially amenable to understanding and change. Notwithstanding the fact that the biophysical environment plays a role in determining the number of people that can be comfortably and sustainably supported in a given region, human relationships with the natural environment transcend passive dependence. Simplistic notions of carrying capacity therefore do not apply (see Box 7).

Indeed, in a modern, interdependent world, the population capacity of a given area can be greatly increased by importing a few critical items, such as plant nutrients. However, dependence on external input can also be excessive and inequitable. Many areas of the North, including densely populated Europe, are heavily supported by a wide range of imported goods. If a trend-through-time assessment was made of the amount of land in the Third World devoted to supplying resources to the North, it would undoubtedly show a dramatic increase over recent decades, despite decolonization. Many of these export-oriented uses of land in the Third World are highly ecologically destructive.

Box 6

The Data Game: Who's Heating the World?

The same data and the same mathematical model can result in dramatically different conclusions, depending on the political assumptions that are introduced into the model. In one recent controversy, an environmental research organization's conclusions about national accountability for global warming were publicly challenged by another which, using the same emissions data, arrived at a very different set of conclusions.

The 1990-91 edition of *World Resources* (World Resources Institute (WRI), in collaboration with UNEP and UNDP; Oxford University Press, New York, 1991) concluded that "developing" countries as a group contribute to nearly half of the global warming problem: a remarkable claim given that it had been widely believed that global warming was largely the result of heavy fossil fuel use in industrialized countries.

The model used by the Washington-based WRI involved detailed calculations of national emissions of greenhouse gases (carbon dioxide, methane, and chlorofluorocarbons). These emissions were then used to calculate a single greenhouse index for each country, based on the differing climate-forcing ability of each gas. Total global greenhouse emissions, calculated by simple addition of each country's emissions, were found to be far greater than the quantity of gases that appear to be accumulating in the atmosphere every year. The difference between amounts released and amounts accumulating is accounted for by the existence of natural sinks for carbon dioxide and methane. WRI described the quantities of greenhouse gases accumulating in the world's atmosphere — that is, the emissions directly responsible for global warming — as net emissions. WRI assumed that each country was responsible for net emissions in proportion to its share of total global emissions. In other words, if a country was responsible for 10 percent of the total greenhouse gases emitted in the world in a particular year, it was also deemed responsible for 10 percent of the net emissions accumulating in the atmosphere in that year. Accordingly, WRI concluded that, in order of responsibility, the top five greenhouse polluters were the United States, the (former) Soviet Union, Brazil, the People's Republic of China, and India.

The Centre for Science and Environment (CSE), based in New Delhi, strongly disagreed with this set of conclusions, pointing out that WRI's model distributes the "absorption credits" of the earth's natural sinks in proportion to a country's emissions, in effect giving the biggest polluter the biggest share. CSE argued that the sinks are a global common

heritage and their absorption benefits ought therefore to be equally distributed among all human beings. Using this logic, CSE assigned each nation a share of the sink equal to its proportion of the world's population. A nation's total emissions of greenhouse gases were then compared with its sink quota to determine its net contribution. Using WRI's data in its modified model (despite disagreement with some of the national data on deforestation rates and methane emissions), the CSE arrived at a dramatically different set of conclusions. India, China, and many other Third World countries no longer contributed to the carbon dioxide or methane accumulating in the earth's atmosphere.

The WRI–CSE debate brings the equity question into sharp focus in the context of global warming and underscores the fact that the interpretation of scientific data is often dependent on political assumptions and biases. The CSE report also points out the degree to which the South stands to be disadvantaged during global environmental negotiations because of its lack of policy analysts dealing with scientific data on global environmental change.

This points to another crucial issue in relation to population and environment: although absolute numbers in population clearly have a bearing on environmental conditions, more relevant factors are the volumes and patterns of consumption of different groups of people. Generally, Northern populations, with their much higher consumption levels, place a greater burden on the global environment than does the much larger population of the South.

Arguments that link environmental degradation to large numbers of poor people tend to overlook a common reality: it is frequently the alienation of land and resources, often to commercial interests, that is behind the degradation of the environment of local communities, and this is the process by which their members are rendered poor. They are the victims, not the culprits, of environmental degradation. For example, forest peoples seldom destroy their environment; more often, commercial logging or land clearing degrades forest resources and impoverishes those communities dependent on them. Similarly, traditional fishers whose resources are depleted by trawl fishing or pollution are rendered poorer by environmental degradation. In cases where the activities of poor people have strained the environment — for example, by opening up new areas of marginal agricultural potential — the cause is as much related to social problems as to population size.

Box 7

The Concept of Carrying Capacity

From a strictly technical perspective, the business of estimating the number of beings of any species that a given piece of land can support is usually extremely complicated and uncertain. The number of relevant ecological variables is enormous. More pointedly, in the absence of cultural considerations, any attempt to estimate the number of people that can be indefinitely supported in a given environment — the human carrying capacity of that environment — is an extremely abstract exercise and therefore of limited value. Carrying capacity is integrally related to the way in which land and resources are used. In other words, the number of people that can sustainably exist within a given environment greatly depends on the manner in which they interact with that environment. The different strategies by which human beings interact with environment is at the core of "culture." Cultural diversity is also why it is so difficult to speak of a "general model" for sustainable development.

It has been repeatedly argued that in India, for example, the population size has outstripped the country's capacity to cope. These statements are not, however, based on any rigorous scientific assessment of the productive potential of the land. Indeed, the most rigorous study undertaken to date indicates that India, through better management of soils and water, more adaptive forms of land use, and increased levels of agricultural inputs, could in fact feed three to four times the population that it contained in the late 1970s. This is of course not an argument for such an increase, but rather an argument against mechanistic perspectives on population.

All this is not to deny that rapid population growth is often associated with poverty and environmental stress. A rapid rate of growth strains the tasks of providing basic human needs. It also increases the difficulties of social, economic, and environmental management, and increases the challenge of providing environmentally sustainable employment. In addition, escalating urbanization results in new types and intensities of environmental stress as well as increasingly unmanageable social and economic chaos. Combined with inappropriate economic distribution policies, the low priority given to rural development worsens the situation by limiting options of the poor in relation to family size and by encouraging environmentally unsound migration. "Environmental refugees" are moving from areas that have been devastated by

physical disaster (artificial or natural) or where access to economic resources has been severed or curtailed for other reasons. Migration from poorer to wealthier regions within and across countries is bound to increase if poverty persists, resulting in increased social tension.

The relationship between population growth and the environment must also be considered within a wider social context. While a large family can increase economic strain on the poor, poor families often prefer more children for economic security. Thus, reducing poverty would tend to reduce family size; efforts to control population without tackling poverty are unlikely to succeed.

In setting population policy, the unethical practices employed in some past and current "population-control" programs must be rejected (including forced or induced sterilization; the promotion of unsafe contraceptives, some already withdrawn in the countries of origin; and the use of birth control as a "conditionality" for receiving subsidies or loans). Instead, policies must address basic social problems and maximize democratic choices for families. Priority should be given to measures that reduce poverty and inequality and increase economic security — conditions that make it possible for poor families to limit family size. This should be accompanied by comprehensive education in family planning and by making safe family-planning methods widely and cheaply available. Improving women's literacy, education, and economic opportunities, as well as reducing household burdens, should also be a crucial component of population policy, improving incentives and options for family planning.

Placing the population factor in the right context is a complex matter that must account for characteristics of the biophysical environment, patterns of resource use and consumption, sociocultural conditions, and the socioeconomic roots of poverty. Accepting these complexities, priority should be given to widening the possibilities and choices for people, especially the poor, to plan their family size. But, however valid a priority family planning may be, it should neither be seen as a substitute for, nor should it deflect from, the changes in lifestyle — in particular, the reduction of wasteful consumption — that are necessary in the North and among Southern elites.

The birth rate is now slowing worldwide and population size in the South will eventually stabilize. Given current demographic realities, however, this will not happen in the short term. Reduced population growth will not substantially affect the reality of massive increases in the human population until well into the 21st century. Thus, efforts to address global change in the coming decades cannot hinge on population control. The major thrust must be to modify global patterns of production, distribution, and consumption.

CHAPTER 2

Causes of the Global Environment/Development Crisis

Together, actions at the local and national levels often have regional and global environmental impact. Conversely, economic, technological, and political forces originating at global or regional levels have significant and sometimes overwhelming effects on actions at community and national levels. Thus, in seeking to understand the causes of global environmental change, it is essential to examine national-level policies and actions, the international dynamics that influence these actions, and international activities directly.

Development dynamics within Northern countries have such a powerful effect on the world — particularly Third World countries — that what are ostensibly national-level decisions and actions in the North are actually international causes of environmental change. Key among these factors are overdevelopment in the North and the assimilation of Southern economies into a North-dominated global economy.

At the national level within the South, sociopolitical systems and development planning approaches — as well as dependence on the world market system — influence the nature and magnitude of environmental change. More specifically, types of productive processes, technologies applied, and patterns of economic distribution are key. As at the international level, the development model within many countries of the South is characterized by production and consumption patterns shaped by gross inequalities in wealth and income.

International Factors

Overdevelopment and Maldevelopment in the North

The industrial revolution saw the advent of powerful technologies that could effect rapid and radical change in the physical and socioeconomic environments. The technological capacity to massively transform nature was accompanied by an equally powerful socioeconomic force: private enterprise. This expanded the reach and impact of the industrialization process. The market system is

characterized by competition between private firms; those that do not perform well — do not make sufficient profit — do not last. This fate is avoided by minimizing costs, by expanding market share, or by concentrating control over means of production. There is a built-in propulsion for companies to expand their size and markets and, in a chain reaction, the resulting market structure compels producers to find ways to further stimulate demand for their products. The emergence of transnational corporations (TNCs), a "logical" outcome of these market forces, jeopardizes national control over expansionist behaviour. Extraterritorial instruments to control TNCs are weak and almost nonexistent.

The economic system is therefore geared toward stimulating ever-increasing demand for nonessential goods and services. Thus, "overdevelopment" in the North is associated with a high-consumption lifestyle. The attraction of many modern consumer products is their immediate convenience; however, this convenience is often associated with hidden environmental costs. Firms also appeal to the rich and middle class to buy "fashionable" and "status-symbol" products. Built-in physical obsolescence and fashion sensibilities — key features of a "throw-away" product culture — are conscious tools to effect increased turnover. The result is superfluous and wasteful consumption. Moreover, although offering some advantages, credit systems (such as the credit card and instalment payment) have also enabled consumers to purchase products at levels that are well beyond their household means.

Beyond direct market forces, government policies and programs are also often geared to overproduction. The agricultural sector, for example, exemplifies Northern overdevelopment and its environmental perils; but, in this case, overproduction is mainly due to subsidies and protectionism. The resulting enormous stockpiles of some agricultural products have to be periodically destroyed. Northern agriculture is also ecologically destructive and energy inefficient.

The propulsion toward environmentally destructive economic growth is not limited to capitalism. Even in the formerly centrally planned economies of Eastern Europe and the Soviet Union, where the profit motive among competing firms was weaker, there was an impetus for unsustainable economic growth. The emphasis on a strong economy and defence industry perhaps

initially reflected a perceived need for security against the powerful capitalist countries. It was also believed that the proliferation of goods made possible through modern technology (that is, by advancing the "forces of production") would contribute to attaining the socialist goal. Moreover, the consumer culture of capitalism, with its attractive range of well-packaged and well-promoted products, was transmitted through the media to the communist bloc, stimulating the appetites of consumers. The highly centralized economic management in communist countries, characterized by a lack of control and democratic participation by people in managing their resources, has had a degrading effect on natural resources and the environment. As well, there has been inadequate development of environmental regulations and technologies. Thus, the former Soviet Republics and Eastern European countries are also ill-prepared for the management of environmental problems.

Both market-oriented and centrally planned economies worldwide have used a large part of their national incomes and intellectual resources for armaments and defence. Because of the secrecy involved, it has been difficult to fully assess the negative impacts and opportunity costs of this use of finances and resources. In a situation where no costs have been spared to produce an ever-increasing arsenal of sophisticated weapons of human and ecological destruction, humanity has had to shoulder the burden of the arms race.

In socioeconomic terms, "overdevelopment" in the North is accompanied by, and indeed dependent on, "underdevelopment" elsewhere. While large parts of humanity (mostly in the South but also a growing minority in the North) cannot satisfy their basic and human needs, the major share of outputs and incomes is appropriated by a relatively small proportion of the population (mostly in the North, but also in the South); and the situation appears to be worsening. The economic activities and consumption patterns of Northern countries have had a far greater impact on the environment and global development dynamics than the relative size of their populations would suggest. Production processes in the North have depleted resources globally and have released most of the pollutants and toxic wastes that have contributed to contaminating the global commons. Thus, primary responsibility for global environmental change rests with the

national economic, social, and technological systems of Northern countries.

The Assimilation of Southern Economies

Colonialism brought massive changes to Third World economies. The subsequent intensification of these changes through the spread of a world market economy controlled by the North is at the core of the international causes of environmental change. Economic propulsion led the West to colonize Third World territories to expand both the available storehouse of raw materials and the market for manufactured goods, technologies, and industries. Where direct force was previously applied, Third World countries are now advised, "encouraged," and economically coerced to continue exporting huge quantities of raw materials for meagre returns.

Thus, in the postcolonial period, as Northern TNCs have expanded to the far corners of the globe, the colonial pattern of world production and trade has become further entrenched. This process of "development" has also been greatly fostered by private commercial banks that provide loans to governments or the private sector; by multilateral agencies (such as the Food and Agriculture Organization of the United Nations (FAO), UNDP, and the World Bank) and bilateral aid programs that provide technical advice and aid and promote certain kinds of technologies; and by research institutes or foundations that provide technical and financial support.

The continued, postcolonial dependence of the South on the North has been a major factor in environmentally damaging policies and actions at the national level, especially in countries that have achieved independence relatively recently. World prices for most commodities are so low that export earnings are insufficient to cover import payments, resulting in balance-of-payment difficulties. In the past two decades, this crisis worsened as huge external loans were contracted for projects that were not viable. In many countries, the combination of low export prices and nonperforming projects led to a crisis in debt servicing. Structural adjustment programs that accompany debt-rescheduling schemes have forced many Third World countries to further expand the volume of their commodity exports to service their foreign loans. In fact, the volume of raw materials exported from South to North

has increased tremendously. This massive hemorrhage of resources from the South has had many environmental repercussions, among which are the destruction of forests for wood; the clearing of land for agriculture, ranching, or mining; the inundation of land for dams; and the depletion of nonrenewable resources, particularly metals and minerals.

At the same time, the export of investments and technologies from North to South has also greatly expanded. Some of the products, technologies, and industries that the Third World has imported from the North have been damaging to the natural environment and to human health. Many of the imported products are inappropriate and harmful. For example, baby food substitutes promoted by milk companies replace natural breast-feeding, which is nutritionally superior. Increased use of pesticides, some banned in the country of origin, has resulted in tens of thousands of deaths in the Third World. (Indeed, although the Third World accounts for only a small proportion of the total amount of pesticides used globally, a large majority of pesticide-related poisoning and deaths occur in the Third World.) Harmful chemicals used or generated during industrial production, or incorporated into consumer products, result in health problems such as cancers, blood disorders, and birth defects.

Growing public resistance in the North to domestic pollution appears to be contributing to increased corporate relocation of environmentally harmful industries to the South, to escape tight safety and environmental regulations. The Bhopal gas tragedy, where 3000 lives were lost and 200000 people were disabled, is a glaring example of the substandard safety practices of many multinationals in the Third World. Moreover, in addition to providing a market for hazardous products banned in the North, the South serves as a dumping ground for hazardous wastes. (Conversely, in the increasingly integrated global economy, pressures to conform to increasingly stringent and expensive environmental standards set in the North will grow, especially for products destined for international trade.)

Despite virtually universal awareness in the international community of the environment/development crisis, and the consequent need to regulate the market and corporations, substantial pressure is being created and actions taken — under the banner of "free trade" — to liberalize the market and reduce legitimate

forms of public control over corporations (see Box 8). Free trade is not necessarily fair; when a strong party insists that a weaker party accept without conditions a free flow of goods and services, and relinquish control over investment, the weak party is likely to grow even weaker and the majority of benefits will accrue to the strong. Indeed, under such conditions, local enterprises in many Third World countries will falter, and the extent of foreign control and ownership of Third World economies will significantly increase. This would reverse the achievements of many Third World countries that have, through postcolonial policies and regulations, reduced foreign control of their economy by building domestically owned components. The use of trade sanctions to enforce the assumed resource prerogatives of foreigners is a form of attempted recolonization that would further frustrate South–North relations.

In terms of the role of aid agencies after the Second World War, many (if not most) of the programs they have financed or promoted have had adverse ecological effects. It is only in recent years, with growing public awareness, that consideration has been given to the environmental impacts associated with the policies, programs, and projects of the World Bank, the regional development banks, FAO, the General Agreement on Tariffs and Trade (GATT), and the bilateral aid agencies of Northern governments (such as the Canadian International Development Agency and the Japan International Cooperation Agency). The role played by research foundations in promoting ecologically harmful projects or programs has still not been adequately studied, but there are an increasing number of reports on the relationship between research funding, research institutes, and the promotion of specific technologies or technological packages, such as the Green Revolution. Moreover, many environmentally damaging technologies developed in the North and transmitted to the South have replaced indigenous systems that were more ecologically sound.

Many of these problems reflect in part massive imbalances in the generation and flow of information. Decisions are normally the culmination of a process involving three related components: information collection, analysis, and decision-making. Currently, there is a "pull" of information from the South by the North and a "push" of analysis and decision-making from the North to the

Box 8

The Uruguay Round: Free Markets, Development, and the Environment

The Uruguay Round of GATT threatens erosion of the "development principle" currently acknowledged in GATT rules, which gives some degree of special and preferential treatment to Third World countries to facilitate their development. As one dimension, many Northern governments are now arguing that Third World countries should no longer be allowed to impose import restrictions on the grounds of balance-of-payment difficulties or to restrict food exports during periods of food shortages.

In the substantial negotiation areas, while the North is showing little interest in reaching agreement on issues of great concern to the South (such as the issue of access of Southern products to Northern markets), it is focusing on eliminating existing restrictions or obligations imposed by Third World governments on foreign companies. In the area of trade-related investment measures (TRIMS), the North is proposing that current national conditions on entry of foreign companies be abolished (such as limits to equity ownership, requirements for use of local materials, and requirements for level of exports); the Third World should be required to accept the presence of all applying foreign companies. A country failing to follow the TRIMS agreement could be subject to cross-sectoral retaliation.

The North is also seeking to bring the service sector within the scope of GATT or GATT-style regulations. Again, it is proposed that all GATT members be required to allow foreign service enterprises (in sectors such as banking, insurance, finance, professional services, media, and culture) to establish nationally, and that these enterprises be accorded "national treatment" (be treated no differently than local companies). As with TRIMS, retaliation for failure to comply could be cross-sectoral — in this case, directed not only against the contending country's service enterprises but also against its export products. In the case of both TRIMS and the service sector, the power of cross-sectoral retaliation would ensure compliance.

That the true motivation behind the "free trade" initiatives is self-interest rather than a consistent ideological position is demonstrated in another controversial area of the Uruguay Round. With respect to trade-related intellectual property rights (TRIPS), the North is propposing that Third World countries adopt strict patent and related laws that would in effect protect Northern companies and individuals (99 percent of existing patents in the world are Northern owned) and

grant monopoly rights over technologies to the TNCs. This protectionism would stunt technological development in the South.

If adopted, the services and TRIMs proposals of the North would spell a regression back to direct economic colonization. Thirld World governments would have little or no power to restrict the behaviour of, or impose obligations on, TNCs.

South. The pull and push in the opposite directions is very weak. Thus, the South relies on the North for analysis of issues relevant to both North and South, and research that does take place in the South is often driven by foreign funding and, hence, foreign agendas. Now, even Southern research of very high quality has no audience in the North; the often extensive knowledge of local people has even less of a profile. As well, flows of information and analysis within the South are weak. Southern leverage in influencing analysis and decision-making also requires greater South–South exchange.

Of course, these dynamics partly relate to inadequate indigenous research capacity within the South, a problem that is further explored in the next section. The issues of research capacity and information flow, and their relationships to decision-making, are also raised in Chapter 3 and Chapter 5.

National Causes in the South

Development Planning Approaches

Having been drawn into the world market as providers of raw materials, the economic policies of most Third World countries following independence have continued to emphasize cheaply priced commodity exports. The environment remains outside major policy arenas, including economic and fiscal policy, and the government and elites, having largely adopted the same economic growth paradigm as the North, have shunned longer term efforts at conservation and wise resource allocation. Thus, as national economies interlock more intensely with the world market, the pace of resource depletion and environmental degradation increases.

Further justification for an essentially "hands-off" approach is derived from the fact that the star of national planning, which rode high through the 1960s and 1970s, has now fallen. The

impetus for planning arose largely from the perceived myopic nature of the market and its failure to deal with externalities and indivisibilities. However, the failure of national planning on a number of economic issues has pushed the pendulum back toward a reliance on the market system. The emphasis is now back on "getting prices right," with a surprisingly large number of writers proposing that a greater reliance on market forces is the way to deal with environmental problems.

Indeed, at a time when many Third World nations are increasingly subject to international economic pressures, the "rolling back" of the state and the weakening of central government authority has decreased regulatory capacity in relation to environment and resources. The state often lacks the capacity to adequately formulate and enforce appropriate policies, laws, and standards. As a result, companies can respond to market signals in complete oblivion of the externalities or diseconomies of their activities, and without the fear of state penalties. Referring back to the international causes, the weakening of state authority is aggravated by a process of regionalization, particularly shown by the intensified development of trading blocs. Given the power of the major trading blocs now taking shape, it is increasingly difficult for nation states to avoid becoming part of such blocs; and the prevailing trend is toward North–South rather than South–South alliances (it is estimated that the European, North American, and Far East blocs control over 65 percent of world trade).

Where resource policies and environmental controls do exist, they seldom address the social dimensions of resource use. Indeed, the main flaw in many Third World resource policies has been the simple failure to focus on human as well as environmental impacts. This is further evidence that current development planning approaches in many Third World countries favour mechanistic rather than humanistic approaches.

Social and Political Systems

The political and socioeconomic structures of many Third World countries — reflected in a concentration of land ownership and highly unequal access to natural resources, capital, credit, and industrial and financial assets — perpetuate environmental destruction and developmental stagnation. The political elite is often closely connected to the business elite. Corruption and

patronage often lead to the approval or continuation of ill-advised, environmentally destructive, and socially damaging projects and activities. In many countries, companies bribe politicians or bureaucrats to buy or approve their products or projects or to grant them forest and mining concessions, for example, and to ignore the associated potential hazards. The formation of coalitions that might be capable of challenging these abuses — for example, trade unions and environmental organizations — is often blocked by perceived conflicts in goals.

These tendencies are magnified in some countries by a lack of true participatory democracy, often reflected in hampered freedom of the press. In turn, a generally lower level of environmental awareness, knowledge, and commitment of Third World policymakers reflects lower levels of public pressure. Where conditions of democratic openness exist, scientists, environmentalists, and the media have often promoted environmental issues to such a degree that governments must pay attention.

The allocation of land and resources is a political issue, but the political dimensions are often couched in either economic or philanthropic terms. For example, to bolster arguments for privatization of land and resources, communal ownership may be cited as an incentive to overuse and abuse the environment (see Box 4). A more profound analysis suggests that many traditional forms of land use are environmentally sound (see Box 2 and Box 9), but the communal decision-making structures that ensure balanced and respectful use of communal lands are weakened by the centralization of power. Mechanisms are usually lacking to effectively involve the public when making decisions about resource use.

This points to perhaps the most critical dimension of the politics of sustainability: sustainable development is the result of a political order in which society is capable of learning from and responding to mistakes in the use of natural resources. Experience suggests that both the potential and the incentive for learning are greatest when those making resource-management decisions are the ones directly experiencing the results of those decisions. Thus, within a framework condemning harm to the environment of other communities, empowering local people to control and manage their resources is generally the best guarantee of sustainable environmental management.

Box 9

Traditional, Sustainable Resource Use: Some Examples from the South

The demographic pattern and mode of production of the indigenous people of Amazonia allows a given area to be used over a long period of time. The population is dispersed in settlements along the rivers. Around the communal houses (called *malocas*) in these settlements, the resident extended family plants food crops in a pattern of established rotation. After several years, the *maloca* is moved some miles down river, and a new cycle is begun. This movement of *malocas* along the river results, in the long run, in a rotation of all the houses that are a part of the community — sometimes 20 or 30. The model is perfectly adapted to the poor soil conditions and fragile forests of the area.

In contrast, Amazonia is currently settled by concentrating the population in fixed areas. The consequences of this strategy are the overuse of surrounding areas to the point of exhaustion and the creation of dependent enclaves whose resource demands stretch far beyond the environs of the town and are destructive of traditional land use patterns of local indigenous populations.

As another example, hidden in the Sierra Nevada de Santa Marta is the remains of a civilization that lived there successfully and sustainably more than a thousand years ago. The Sierra Nevada is a coastal mountain range. From the base at sea level to the snow peaks, it has one of the longest vertical climbs in the world, and all microclimates of the neotropics are represented. The Indian population of the Sierra was concentrated in urban-style settlements whose economies were highly interconnected. This successful civilization, characterized by high population density and low environmental impact, was based on highly efficient and sustainable use of the region's productive capacity, the development of a technological complex highly adapted to the specific conditions of the particular environment, and a coherent and well-integrated social system.

Specifically, the settlement pattern involved many dispersed urban settlements of various sizes, distributed over the different altitudinal floors of the Sierra. Agricultural crops and cultivation practices were matched to the specific ecological characteristics and productive capacity of each level, and the people living on the coast fished and gathered salt. The settlements were interconnected by roads paved with stones; a system of exchange of goods among the different settlements enabled each community to obtain the specialized products from the various altitudes. Under these conditions, the carrying capacity of the region

was high, permitting a relatively large population (up to 100 000 people) to maintain a high living standard in relative environmental harmony.

In contrast, the Sierra is currently populated by immigrants whose imported systems of production are poorly adapted to the local environment. The environmental impacts of existing land use have resulted in extensive degradation of productive capacity and an associated impoverishment of the population, which now stands at about 20 000. Given low levels of social and economic integration, family units survive independently by extracting as much as possible from their immediate surroundings. The random occupational pattern is relatively insensible to the different microclimatic and other ecological features of the various altitudes. Soils are used without considering specific productive capabilities. Land is intensively exploited around the essentially self-sufficient settlement units to the point where erosion problems, soil exhaustion, and water shortages become critical. Emigration to other areas of the same region follows, and the pattern is repeated.

One of the most crucial but least recognized dimensions of the current environment/development crisis is the loss of community-level control over environment and resources. When communities are deprived of control over, and even access to, the resources on which they depend — as when land and resources are appropriated and transferred to commercial interests — the environmental and human repercussions can be devastating.

For example, in the forest communities of Asia, cultural dependencies on the forest are integral and complex. The diversity and wealth reflected in the knowledge of indigenous communities regarding natural resources is expressed in traditional technologies. The knowledge was generated by trial and error in interacting with nature over many centuries and was accumulated and transmitted from generation to generation. It is based mainly on diversified and sustainable use of natural resources. Shifting cultivation was environmentally sustainable over many generations. Thus, the environment has shaped the people; their economy, their way of life — in short, their culture — reflect, above all, human adaptation to the natural environment.

But outside logging interests, empowered by national governments to log the forests on which these communities depend, have no understanding of, or sympathy toward, the traditional shifting cultivation concepts. As a result, they disrupt the

traditional patterns of cultivation. The destruction of the forest means the destruction of not only the people's economy but also the very essence of their culture. In the long term, this means a sacrifice of economic productivity, because people are generally unwilling or even unable to adapt once their culture has been destroyed.

As another example, the inequitable distribution of land in Brazil has led thousands of poor farmers to obtain farmland by clearing parts of the Amazonian forest by burning. If these farmers had access to already cleared lands, they would not have to burn existing forests. The negative impacts associated with these processes of alienation are often accelerated by the loss of traditional knowledge and technologies. Indeed, with the adoption of Northern development paradigms and technologies in the South, traditional capabilities are being lost at an alarming rate.

Finally, Southern countries, like those of the North, have been drawn into wasteful and irrational expenditures on arms and defence. In the East-West confrontation, some of the poorest countries were pushed into bankruptcy by war. Somalia, for example, ranks fourth lowest in the world in terms of per-capita income. In the early 1970s, however, 23.3 percent of central government expenditure was on defence. In 1989, 14 percent of Zaire's central government expenditure was on defence, equivalent to its combined expenditure on education, health, housing, amenities, social security, and welfare. Zaire's economy is in shambles, despite its considerable natural wealth. Most of the expenditures in arms are in foreign exchange. The combined foreign debt of Third World countries now exceeds 1.3 trillion United States dollars. The World Bank estimates that, in some countries, as much as one-third of the debt can be ascribed to the arms trade. Given their built-in obsolescence, money spent on arms has been largely wasted.

Patterns of Consumption and Distribution

The high levels of direct dependence on primary production in many regions of the Third World are no guarantee that the basic needs of people in these regions will be satisfied. Very unequal income distribution within most Third World countries ensures that a major share of the goods and services produced or imported for local use are luxuries for the rich and middle class.

Because of their lack of buying power, the real human needs of the poor are not translated into the production of basic goods and services.

The luxury products and services toward which production is distorted are patterned after those of the North. As in the North, the consumption patterns of the Third World economic elite are highly wasteful. As many of the goods and services have high import content, their consumption is not only resource- and energy-intensive (thus depleting resources) but also contributes to the outflow of foreign exchange and balance of payment problems. To raise the foreign exchange for these imports, the export of raw materials and natural resources is intensified, compounding such development and environment problems as massive debt and resource depletion.

In most countries of the Third World, industrial development and economic growth in general continue to be associated with greatly increased energy consumption. At a broad level, the legitimacy of increased access in the South to various forms of energy is clear, but the need for intelligent energy policies and programs is also clear (see Box 10). Major environmental effects are also associated with the increasing use of motor vehicles. Environmental quality and quality of life are both adversely affected by the increased use of energy and other resources and by the construction of transportation infrastructure.

Some Problems Related to Production

In global terms, the 1980s were characterized not only by a slowdown in economic growth but also by the declining prominence of primary products in the world economy and a decrease in the relative economic importance of industrialization in the countries of the North. In the majority of Third World countries, however, primary production remains the central economic sector and industrialization maintains its ascendancy. These two main sectors of production in many Third World economies — primary production and manufacturing — are highly resource intensive. This is a major source of environmental stress, especially in light of the inadequate checks and balances by the state, as previously discussed, and the prevalence of environmentally inappropriate technologies and production systems. These production systems usually coexist with the remnants of indigenous production

Box 10

Energy Consumption

Increasing energy consumption in the Third World is not so much a reflection of population growth as of development processes, including increased levels of activity and technological change in industry, agriculture, urbanization, and transportation. Increased access to modern (including alternative) forms of energy is a legitimate development requirement, especially in providing basic services. Indeed, environmental problems associated with the current reliance of many Third World people on biomass for energy (for example, deforestation for fuelwood) could be ameliorated through increased access to other sources of energy. However, not all activities contributing to increased energy consumption are desirable; indeed, strategies to rationalize energy use should address the relevance of the uses to which energy is put.

Taking the inevitability and legitimacy of increasing energy consumption in the South as a point of departure, Southern governments, industry, and the general population have nonetheless inadequately addressed the necessity of energy conservation, energy efficiency, and the development of alternative (particularly renewable) energy sources. A basic constraint is that transcendental breakthroughs in efficiency have not been achieved; many energy-saving technologies that exist in the North are not accessible in the South for financial or other reasons. Adopting technologies to improve energy efficiency is an important component of technological modernization, greater self-sufficiency, and enhanced international competitiveness in the South. However, the appropriateness of some technologies in Southern contexts must be critically considered. For example, repair of a highly efficient pump may require technical expertise not available in rural areas. A week of downtime during planting season, while the pump is being serviced at a distant urban centre, could be disastrous for the farmer.

With respect to fossil fuel consumption in particular, the greater availability of petroleum has to some extent softened the will to develop alternative sources. In the longer term, however, nations of the South will find that they have invested precious income in fossil fuel technologies that may well become obsolete, or at least prohibitively expensive, within the next generation. In sum, there is immediate need for both a rationalization of energy use in the North and a concerted research focus on more sustainable energy options in the Third World.

systems, which may or may not be significant, depending on the region or country.

In criticizing land and resource degradation in the South, Northern assumptions of moral superiority are clearly not justifiable, given the extent to which natural conditions and resources have already been destroyed and degraded in the North. Nonetheless, the serious environmental deterioration that is being caused by resource exploitation in the South must be recognized and addressed by the peoples of the South.

Primary production

In recent years, a declining proportion of the world's economy, as measured in monetary terms, has depended directly on primary resources. However, a high proportion of the economically active population in the Third World continues to depend on primary activities, and, at a subsistence level, there is extensive direct reliance on primary production. The exploitation of land, forests, and water resources, among other primary natural resources, constitutes the basis of survival of 60 percent of the population of the Third World. As the population continues to grow, the demand for food and other basic necessities will increase, and there will thus be greater pressure on natural resources. High exports of primary products and the associated disruption of production systems oriented to satisfying local needs are also major sources of pressure.

The distribution of primary production activities in the natural landscape does not always correspond to ecological realities. For example, the lack of adequate policies and technologies for the integral and multiple use of forest ecosystems has lead to their massive transformation for agricultural and livestock production. When ecosystems are transformed in ways that are grossly negligent of natural characteristics, the results in the medium and long term are, to say the least, counter-productive: severe soil and water degradation and, at the extreme, a general collapse of life-support capability.

An illustration is the loss of forest ecosystems through deforestation, which, in turn, causes soil erosion, loss of soil fertility, sedimentation of waterways, changes in or even depletion of hydrological cycles, and extinction of animal and vegetable

species — in short, massive destruction of ecosystems and their genetic resources. In many cases, logging also causes irreversible damage to the economies and cultures of tribal peoples.

It is estimated that 2 million square kilometres of Latin America has been deforested in the last 30 years. Of Latin America's total annual clearcut of 50 thousand square kilometres (close to 80 percent of which is in the tropics), only 4.1 thousand square kilometres (8 percent) are regenerated in either a natural or induced manner, and the biological diversity of this regenerated fraction is lower than that of the original forest. More than 60 percent of the clearing carried out between 1971 and 1986 in Latin America was due to the expansion of the cattle frontier. Within Central America and the Caribbean, the deforestation of El Salvador and Haiti is dramatic. Haiti in 1923 had 60 percent of its surface occupied by forests; by 1974, this had been reduced to 7 percent. Fully 30 percent of Haiti's territory is currently unproductive.

In Southeast Asia, commercial logging is the main cause of deforestation. The wood from these forests accounts for most of the world's trade in tropical timber, much of which is exported to Northern countries, especially Japan. At current rates, most of the region's primary rain forest will be logged or degraded within 20 years.

Another main cause of soil degradation during the last four decades has been the expansion of the agricultural frontier beyond areas that have reasonable agricultural potential. Within areas of good agricultural potential, soil erosion has also rendered useless vast areas of production. In addition, intense agricultural technologies, which depend on high levels of agrochemicals, energy, and capital, have resulted in soil contamination, salinization, and water pollution. Latin America's 2 million square kilometres of eroded land corresponds to 10 percent of the region's surface area (equivalent to the area of Mexico). About 80 percent of Mexico's territory suffers from some type of erosion, and 30 percent of the area is considered to be subject to severe erosion. In the Third World, between 6 and 7 million hectares of cultivatable land becomes unproductive every year, a massive obstacle to development.

Manufacturing

Contrary to trends in the North, industrialization continues to increase in most regions of the Third World. While the 1980s saw small increases in the ratio of industrial to total gross national product (GNP) in many Third World regions, the ratio of industrialization for many Northern countries declined. For example, according to the World Bank, the ratio for the Organisation for Economic Cooperation and Development (OECD) declined from 36 to 31 percent between 1980 and 1988.

As more of the income base of the countries of the South shifts to manufacturing, the pressure on natural resources is maintained and environmental degradation persists or is aggravated. Indeed, the shifts in both type and quantity of goods produced often depend on more intensive exploitation of primary resources. Thus, increased industrialization in the South has come with all the attendant environmental repercussions: resource depletion; consumption of energy; generation of pollution and wastes and consequent contamination of water, soils, and air; occupational hazards; health threats to local residents; etc. Because of the sociopolitical dynamics previously discussed, standards of safety and pollution control are often far below what would be required in the North.

Several factors compound the problem. Primarily, the general scarcity of capital means that retrofits or process changes in existing plants (which are often old, poorly equipped, and heavily polluting) are not priorities. This is particularly true in cases where large investments would be required for what are seen as economically nonproductive ends, an obvious example being the cleanup of toxic sites. Also, in many cases, the technologies must be imported, requiring scarce or unavailable foreign exchange. It is often difficult for the South to obtain international assistance to address environmental problems related to older industrial plants; in many cases, these are no longer priority environmental issues within the North (already having been addressed by upgrades or retrofits, for example). International attention, guided as it is by Northern concerns, is focused on more recent problems. Finally, the need for foreign investment may make it difficult to insist on the best available technologies for new plants.

Scientific and Technological Dependence and the Homogenization of Production Systems

In the modern urban/industrial sector, the availability in the South of the scientific and technical capability needed to minimize human impacts on the environment is generally highly inadequate. Moreover, existing traditional knowledge on the wise management of the often rich natural resource base is not adequately recognized and is often being displaced. Third World countries today face problems of environmental degradation at a time when the global technological order is rapidly changing. Given limited scientific and technical capacities, nations are forced to choose whether they should address their grassroots realities or pursue the Northern development ideal. An entire range of new technologies is continuously evolving — the most critical of which include microelectronics, biotechnologies, and communication systems — and are affecting almost all aspects of development. The Third World is even lacking the capability to assess, or to control decisions on, whether and how to adopt and adapt to these emerging technologies.

The direction of most technological change is now toward greater capital and technical intensity and lower labour intensity. Therefore, with the goal of technological modernization, it is proving particularly difficult to reconcile the objectives of eradicating poverty and generating employment. There is an absence of appropriate policies to guide technology choices toward environmentally sound and socially just uses of natural resources. Consequently, Third World countries are often propelled into new technological territory more quickly than their domestic policy frameworks, management systems, and scientific capacities can effectively manage.

As a result, governments and other agencies in many nations of the South promote the adoption of inappropriate technologies, often supported by Northern aid programs. Indeed, the ways in which natural resources are appropriated increasingly exhibit a set of common traits regardless of location. Specific technological packages, developed for a particular set of conditions, are transferred to other regions with little adaptation to cultural, socioeconomic, or environmental differences. Based on the apparent success of these technologies and the technical feasibility of their application, support is given to developing means for their duplication (institutions for delivery, mechanisms for financing).

As evidence of a surprising degree of resilience and flexibility, many resource-management traditions have been maintained in some form, expressing themselves particularly during periods of crisis. Nonetheless, the loss of traditional knowledge of the many indigenous and campesino communities — an archive of empirical knowledge generated over centuries of experience and oriented toward sustainable production — is accelerating. The homogenization of styles of development, forms of production, and related technologies has resulted in both deterioration in natural environments and loss of cultural diversity. In the industrial sector, the same process has taken place: displacing small-scale indigenous production systems and establishing energy-intensive, large-scale industrial plants, with hazardous or polluting effects. The replacement of local technologies has resulted in both direct environmental damage and greater Third World dependency on foreign input.

For example, the technological package of the Green Revolution was hailed at one time as a "miracle" and was introduced into all regions of the Third World without regard for their basic characteristics. Since that time, it has usurped traditional technologies, displaced genetic variety, promoted excessive use of chemicals, depleted soil nutrients, caused problems with water supply and irrigation, induced pest immunity, and generally provoked ecological and cultural degradation. There is now a movement to return to more ecological forms of agriculture. Another example in the realm of primary production is the displacement of traditional fishers and their methods by modern trawlers and equipment. This has commonly resulted in the depletion of fishing grounds and the loss of livelihoods and sources of nutrition to fishers and their communities. In some Third World countries, trawl technologies had been introduced by Northern aid programs.

Conversely, a major barrier to more sustainable forms of development can be a lack of introduction and commercialization of appropriate technologies. For example, integrated pest management can help reduce pesticide use in agriculture; however, it also requires good scientific understanding of local ecological, crop, and pest specificities.

As another dimension of scientific dependence, environmental research by natural scientists of the North often cannot be verified

by Third World researchers. It must be accepted on faith. In most Third World countries, there are no systematic mechanisms to monitor, document, or disseminate information about environmental change. Awareness has increased, but little is done. This is one factor in the problem of inequitable participation in decision-making on the global environment, and may be particularly critical in relation to the management and use of the global commons. In Latin America, for example, technological and scientific weakness has led to a dependency for basic knowledge about the resources and potentials of the semi-open seas, including reproductive cycles of commercial marine species. The tendency to globalize management of the "commons" will further strengthen the dominance of the North, given its superiority in terms of inventories and basic knowledge of resources.

Scientific data is often "exported" from the South for analysis and use in the North. In some cases — Costa Rica and some countries of Africa, for example — research by nonnationals is virtually unregulated, and much of the research undertaken by Northerners involves no sharing of skills or results with local researchers. Indeed, some natural areas in the South have virtually become Northern research laboratories. In contrast, resources are extremely limited for Southerners to study environmental conditions and sociopolitical trends in the North, even though these conditions and trends may have significant implications for Third World development and environmental management.

Similar concerns are relevant to the trading of debt loads for territorial or environmental patrimony. In some cases, these "swaps" are made without evaluating the long-term implications or, indeed, even a clear understanding of the perspectives of the particular program. Also, there are no adequate mechanisms to control the ransacking of indigenous species or to ensure that knowledge generated by research is shared with the people of the region. Thus, unexpected and often unproductive changes have resulted from some recent efforts to protect biodiversity.

CHAPTER 3

Responding to Global Environmental Change within a Fair and Sustainable Order

International Implications, Obligations, and Opportunities

The environment/development crisis has reached disastrous proportions for the planet as a whole and for peoples worldwide. As the 20th century draws to a close, our challenge is to determine how we are going to manage this extremely divided and increasingly overexploited world in the interest of all. The gravity of such problems as resource depletion, pollution and contamination, toxins and environmental health, and climate change require urgent solutions, many of which lie beyond the national level. International cooperation in several major fields is essential to resolve the environmental crisis peacefully and for the long term.

The environmental crisis is a profound opportunity to restore and strengthen international cooperation within a global agenda. It is an opportunity to focus the minds and wills of political and economic leaders, as well as people and their organizations, on broad and mutually beneficial strategies and mechanisms to ensure humanity's survival. The voices of ordinary citizens around the world — victims of environmental degradation and development gone wrong, and witnesses to the possible death throes of nature and humanity — must carry through forcefully to the decision-makers. We must insist on an end to the madness of unsustainable and unequal growth and on a beginning to cooperation in a spirit of genuine internationalism.

The physical changes required for sustainability — drastic reductions in the depletion and degradation of resources, and in the pollution, contamination, and toxicity that result from modern systems of production — cannot be accomplished solely by technological means. To properly resolve the ecological crisis, it will be necessary to change the high consumption characteristics that are now built into the socioeconomic system. In turn, this will require drastic changes in economic development models (including modes of production and technological systems), in

values and lifestyles, and in economic and political relationships. The ecologically damaging technologies and production processes that characterize modern systems must be changed, and traditional sustainable methods that are still intact or recoverable must be reassessed, defended, and promoted. A new process of economic structural adjustment is also essential: one dictated not by financial discipline oriented to debt payment, but by global and national ecological imperatives. The key question is how the burden of this new structural adjustment will be distributed, among nations and within nations.

Indeed, without equity considerations, proposals to address environmental destruction may translate into stagnation at current levels and styles of development in the Third World, with the North maintaining its already high living standards. This amounts to legitimizing a new form of domination over the Third World. Instead of structural reforms in the North, new mechanisms would be devised to compromise the Third World's sovereignty over its natural resources, as occurs when biological resources from the South are patented and sold back to the South at a hefty profit. Pressures on the South to limit its population growth would also intensify, to prevent an increased population from consuming Southern resources that the North requires to sustain its overconsumption. In fact, in a world of scarcer resources, Northern interests concerned primarily with maintaining the flow of materials and resources to sustain current production systems and lifestyles may use direct force to control or have access to these resources.

An important opportunity for reviving international cooperation on a comprehensive scale is the United Nations Conference on Environment and Development (UNCED), where over 100 heads of state or government will gather in Rio de Janeiro in June 1992. In the preparatory meetings for UNCED, major issues revolved around the control, distribution, and use of the world's increasingly scarce natural resources; the degree of culpability of different countries with respect to such global environmental problems as climate change; the related onus of responsibility for resolving such problems; and the options and capabilities for their resolution.

In June 1991 in Beijing, 41 Third World countries participated in the Ministerial Conference on Environment and Development.

The declaration of this Conference stressed that inequities in current international economic relations undermine the ability of countries of the South to effectively participate in global environmental efforts. This declaration constitutes a clear statement of the views of Southern governments on the principles on which the UNCED negotiations should be based. Economic and environmental issues must be linked within "a new and equitable international economic order" and the countries of the North must take the lead in eliminating environmental damage and assist Southern countries in overcoming their problems. Several mechanisms to meet these responsibilities were proposed. In addition, the statement reaffirmed the Third World's sovereign rights over their natural resources. Under such conditions, the South could agree to national adjustments favourable to the global ecology, such as a halt to destroying tropical forests, the conservation of biodiversity, and minimizing the use or production of harmful substances. Currently, however, the chances for such a bargain do not appear bright. It is more likely that governments will continue to argue for years to come, while the environment continues to be degraded and destroyed. The problems of humanity may be too complex and deeply entrenched for the Earth to be saved.

Elements of a Fair and Sustainable Order

This section summarizes the specific elements that must form the basis of negotiation for a sustainable future. The discussion primarily addresses the roles of international and national governmental bodies and major institutions; however, peoples' movements, NGOs, concerned scientists, and other environmentally conscious individuals have a major role to play. After all, these are the groups and individuals that first alerted governments to the worldwide ecological crisis.

Poverty, Affluence, and Needs

The phenomenon of poverty is linked to inequalities at both international and national levels, and is the direct result of a wide range of factors. Although poverty cannot be defined in strictly economic terms, from an environmental perspective, the material dimensions are key. Absolute poverty — the inability to obtain, on a day-to-day basis, adequate food, shelter, and clothing — is

the living condition of 1.2 of the 2.7 billion people living in the tropical and subtropical regions of the globe. About 20 percent of the world's population is malnourished to the point of serious risk to growth and health. Each year, many millions die of starvation or hunger-related disease.

The key to addressing the complex set of circumstances that induce poverty at both international and national levels is to reduce the scale of inequality by

- Redistributing resources and incomes;
- Shifting the type of goods demanded and produced from relative luxuries to basic goods and services; and
- A corresponding shift in investment.

Place poverty at the top of the international environment/development agenda

To address poverty, the international economic order must be reformed. The alleviation and ultimate elimination of poverty must be at the top of any genuine agenda on development and environment. Indeed, a sustainable global order presupposes that the main axis of international policy formulation will be the development of the majority of humanity. The elimination of poverty must be seen as a means of enhancing productivity, not as aid or charity. In addition, a comprehensive strategy is required to substantially reduce outputs and consumption in the North, while ensuring a fair and equitable distribution of the burdens resulting from such a fundamental reorientation.

Address poverty and affluence in the North

As an internal condition, poverty must also be given priority at the national level. Northern governments should counter the disturbing trend to increasing poverty in their own countries by strengthening national social security systems. To reduce income disparities both internationally and nationally, Northern governments should drastically reduce corporate subsidies and increase taxes on luxury consumer items and on the incomes of the upper and middle classes. Investments in luxury products should be discouraged through planning and fiscal measures. The resources thus freed up could be used to address poverty in both South and North.

Restructure national policies and programs in the South

In the South, while alternative models of development are undoubtedly essential, a productive increment is also essential. Current stocks of capital and flows of goods and services are not sufficient to meet the legitimate needs and aspirations of peoples in the Third World. In addition, Southern governments must reorient their development strategies toward the eradication of poverty, the fulfilment of basic and human needs, and technological orientation to environmentally sound production systems. The eradication of poverty and the fulfilment of basic needs necessitate social policies for the redistribution of land, or at least access of the poor to land, and an emphasis on people-oriented policies focusing on health, nutrition, housing, education, and transport.

Southern governments must increase their understanding of, and attention to, the links between technologies, scale of economic activities, and poverty. The destruction of the technological and social bases of community economies, often related to the introduction of inappropriate technologies and scales of production, must be stopped. National development plans should ensure that development projects do not have net social costs. On the contrary, development has to be reoriented to protect and enhance the rights of small communities to their land and to basic facilities.

In most cases, where the issue of poverty has been accorded importance in a national agenda, the resultant plans and policies have not adequately reflected environmental linkages. The primary investment focus should be on regions and sectors where the links to environmental degradation are most severe. In fact, rural poverty is often most intense in environmentally degraded areas, such as rural areas with high rates of deforestation and degradation of agricultural lands. In this situation, the aim should be to generate sustained livelihoods by supporting ecologically sound systems of production. In this way, environment and development needs can be served simultaneously (see Box 11).

Support community-level initiatives

At the community level, efforts must be made to apply national policies in ways that benefit the poor. Pivotal to this is devolving control over resources back to where it originally resided: from international systems to the nation state, and from the state to

Box 11

A Program for Global Antipoverty and Ecological Regeneration

Many of the world's poor live in ecologically degraded regions; and, in these regions, the threat of impoverishment is generally greatest during periods of environmental crisis, such as drought. Helping hard-hit communities through employment opportunities in restoring and enhancing their surrounding environment and resource base provides both immediate economic security and the potential for an ecologically secure future. (It should be realized, however, that in some poor regions there is literally no labour surplus. In cases where poverty does not necessarily reflect a lack of employment, the creation of alternative employment opportunities should not draw people away from essential work.)

The Centre for Science and Environment, in New Delhi, proposes that such a program be used to back up an internationally guaranteed Right to Survival. The immediate aim of the program would be to put a floor to poverty, ensuring, at a minimum, a basic wage that provides people with sufficient purchasing power for survival. More progressively, however, if jobs in ecological regeneration were guaranteed to people in regions where environmental degradation or crisis was seriously threatening potential livelihood, these people would be able to stay to build their ecological capital, rather than joining the swelling ranks of environmental refugees. A key focus would be on improving local agroecosystems to create the potential for sustainable livelihoods. One of the additional benefits of such a program would be to relieve pressure on remaining wildlands and areas of high genetic diversity.

local communities. The socioeconomic legitimacy of the "people's economy" — small firms, small farms, etc., mainly family owned and operated — must be recognized as equal to, if not greater than, that of private-sector corporations or large state-run enterprises. Support for this economy does not require major subsidies and does not impose environmental strains or national financial burdens. It does require practical recognition by governments of its legitimate right to exist and thrive, recognition in the form of protected access to land, availability of small lines of credit without collateral requirements, accessibility of operating permits or licences for small producers and merchants, and possibly some marketing assistance. The right of the "people's

economy" to exist and expand must be a central tenet of sustainable development. In sum, the operating principle should be better community access to resources to enable sustainable livelihoods based on local resources and appropriate technologies, and oriented to fulfilling basic and human needs.

Economic Order and Development Patterns

Given the critical influence of the global economic order on environment and development worldwide, even the most intense and well-oriented economic reforms at the national level cannot achieve what is necessary without accompanying reforms at the international level. This is not to deny the need for, and indeed centrality of, internal changes in Third World countries. But such changes will not be sufficient. Primarily, the current economic order blocks the path to development in the Third World. Thus, the following proposals are oriented to strengthening the position of Southern countries within the world economic system. The new regime must allow autonomous development in the South within this system.

Improve the terms of trade for the South

For good environmental and economic management in the South, unfair economic trade terms must be rectified. Primarily, current commercial conditions, which concentrate goods, services, and investments primarily in the nations of the North and marginalize the countries of the South, must be modified. There must also be North–South cooperation to reverse the massive and untenable flow of resources from South to North. Ecologically unsound trade must be discouraged, while preventing the use of environmental issues as trade weapons. In addition, the preferential treatment of Third World countries in trade arrangements should be continued, especially in the GATT, where some Northern countries seek erosion of this principle (see Box 8). "Free trade" must be tempered and balanced by the South's legitimate needs to control national development policy and build indigenous capacity.

Reduced prices for primary products have been particularly devastating for some Third World countries, both economically and environmentally. In Latin America, for example, reduced prices have led to the spread of export-oriented agriculture and expansion of the farming frontier and mining areas. Among other

things, fair prices for primary products are essential — prices that reflect environmental and regenerative costs and the costs of complying with international conditions. In other words, prices of raw materials from the South must be significantly raised to reflect their real and ecological costs. This will not be possible without appropriate international public policies jointly developed by the producing nations of the South and the consuming nations of the North.

Specifically, one important step would be support from Northern countries for producer–consumer commodity pacts that would fix reasonably high prices for commodities and establish supply plans. Programs of the United Nations Conference on Trade and Development, including the integrated program for commodities, should also be reviewed and strengthened in light of the environment/development crisis of the 1990s. Northern governments must also phase out trade protectionist policies that block or limit the South's access to Northern markets, particularly in relation to basic industries — such as textiles, clothing, and processed raw materials — that are on the rise in the South.

Expansion of trade, investment, and technology transfer between the countries of the South is also essential for more balanced trade relationships. This initiative must come from the South, but should be facilitated, rather than hindered, by the North.

Deal with Third World debt and structural adjustment

The current structural adjustment policies and programs of the World Bank and the International Monetary Fund (IMF) impose additional burdens on the Third World poor. The transfer of resources to other countries during the 1980s, in large measure to service foreign debt, has been the central impediment to improving economic conditions in many Third World countries, particularly in Africa and Latin America. Without a favourable, or at least balanced, flow of resources, regional development will not be possible, as the poor countries require an accumulated increase in production to cover even elementary needs.

The structural adjustment programs imposed on indebted countries should be significantly revised. In lieu of current approaches, mechanisms should be established that relieve debt burdens and thus release financial resources that Southern countries require to

deal with their development and environment problems. At the same time, the countries of the South must pursue alternative development strategies that fulfil people's needs without leading the national economy into new external indebtedness.

Regulate transnational corporations

A comprehensive framework should be established to regulate the conduct and effects of TNCs, which are globally the most powerful forces impinging on environment and development. In particular, more effective regulation of TNCs is required in the areas of investment, finance, trade, health, environment, wages, and technology.

Ensure equitable distribution of costs and benefits

The responsibilities, risks, costs, and benefits of environmental protection must be equitably allocated through global negotiations, and considerable attention should be devoted to approaches to, and components of, this "global bargaining" process. This process will inevitably be complex and difficult. The stakes are high, the issues are very politically charged, and the approach taken to the required interregional and intertemporal comparisons depends on the interests at stake and the values applied. These comparisons are also potentially subject to religious, racial, and other prejudices. Nonetheless, there must be a means of weighting relative responsibilities and an associated distribution of costs borne and benefits earned by different individuals, social groups, or countries. Incentives and disincentives must account for the differential impacts of countries on the global environment. The resources of the world are finite, and the rich should not persist in taking a disproportionately large share. Ultimately, the countries of the North — with high levels of responsibility for causing global environmental change, greater financial resources to devote to solutions, and control over basic levers of power (aid, trade, and debt) — must address the issue of sustainability from the foundation of equity and must bear the greater burden for a broad transition to more ecological forms of production.

Taking energy use as an example, the countries of the North, with their much higher total and per-capita fossil fuel consumption, and associated higher emissions of greenhouse gases, must

- Ensure more rational use of energy in the North;
- Work with the South to create an international framework that allows all people equitable access to the atmosphere;
- Provide technological and financial assistance to nations of the South to enable them to achieve maximum efficiency of energy use;
- Assist vulnerable Third World countries in coping with the impacts of climate change; and
- Provide technological and management support for sustainable, integrated use of forest ecosystems and eliminate international economic pressures that encourage short-sighted exploitation of tropical forests.

The Political Order

Knowledge about, let alone participation in, the global environmental debate is limited to a small proportion of humanity, counted largely among the well fed and well housed. Most of the world's peoples are, at best, spectators to this debate. Greater popular awareness of environmental issues and greater participation in their resolution are essential. Indeed, the global environmental debate must be democratically anchored in the national and local politics of every nation. The need for environmental management should not be posed as a trade-off against democratic rights. Credible institutions committed to equitable solutions are also essential at the international level.

Democratize resource management and environmental action

At the national level, democratic systems of government and true participatory democracy are crucial for protecting the environment and promoting sustainable resource use. Policy changes should support the decentralization of planning. Also key are freedom of the press and freedom from monopolistic ownership and control of resources and production. Where political will and leadership on environment issues do not exist, it is necessary to question how to generate them.

What form should a national government take to ensure that it responds to people's genuine interests and aspirations? Dictatorships are not the best way to manage natural resources and ensure that long-term concerns are well accounted for; neither are multiparty parliamentary systems, by themselves, adequate. Even within political democracies, the impact of existing environmental and natural resource policies and laws on people's participation in management must be examined. Vital questions about the types of village and urban institutions required also need to be addressed.

Systems of participatory democracy must be clarified. In particular, the kinds of laws, institutions, and processes required to increase people's control and management of their natural resource base must be determined. There must be opportunities for local peoples to exercise their traditional knowledge in managing their own environments. Where they exist, respect must be accorded to common property resources such as grasslands, forests, and aquatic systems, especially those of importance to the poor. People dependent on natural resources (in particular, women, indigenous peoples, nomads, and fishers) should not be marginalized or impoverished for the sake of "development." Women in particular must be empowered with equal opportunities for education and equal partnership in development. At a more prosaic level, equality must be nurtured through the sharing of daily tasks.

Information on global change should be reaching both policymakers and citizens. The technocratic perception of environmental issues is a key factor in removing them from domestic political discussion. Environmental concerns should not be the reserve of the technocrat. As a related point, while the role of the state in setting policy and managing major programs is key, the role of NGOs, social movements, and local communities is also important. NGOs must have better access to information to support advocacy work, and national and regional NGOs need information about activities and impacts at the local level. Coalitions of people that reach beyond political, religious, and racial boundaries are needed, as global environmental threats obey none of these boundaries. A particularly important gap lies in the formation of Southern NGO coalitions.

Recognize the sovereignty of Third World countries

The bedrock of a sustainable future is the freedom for communities and nations — within a universally accepted framework that prescribes penalties for harming another community or nation — to control the use and management of their natural resources and thereby determine their own form of economic and social development. Each society can then experiment and learn from its own mistakes. Sustainable development cannot be imposed by an external agent.

Sovereignty is especially critical in relation to natural resources and economic policy. This relates in part to the right to determine the terms under which TNCs can invest in a country (a right being challenged in the current Uruguay Round of GATT negotiations).

Create fair, credible, and democratic international institutions

To support international and equitable sharing of responsibilities for global environmental change, institutional development is essential. International concern for environmental change is producing a normative order that orients investments, commercial movements, and technological relations. This order and the resulting regulations will not necessarily be sensitive to the needs and demands of Third World nations. Indeed, experiences of the Third World with international organizations have led to a belief that the rich countries are unwilling to foster institutions that are responsive to the particular needs of the South. This points to the need for a critical examination of the degree to which the existing world regulatory order, including existing international environmental structures, ensures equitable treatment of all states and respect for their sovereignty.

With respect to international economic institutions, the Bretton Woods institutions (the World Bank and the IMF) and other major international economic actors (including TNCs, the international banks, and GATT) are Northern controlled. These organizations promote policies without addressing their implications for the exploitation of natural resources or for environmental conditions in general. They have thus been largely responsible for promoting the transfer of environmentally unsustainable and socially unacceptable economic models and technological systems from North to South.

The operations of these institutions must be changed so that they promote just and ecologically sustainable policies. As well, the principle of democratizing world economic institutions must be implemented through a program of action that gives the South equitable decision-making power and that is oriented to reducing the concentration of control over investment, production, and trade. Moreover, these institutions, with decision-making powers that affect the lives of so many people, must be made more democratically accountable. Decision-making processes should be transparent and accessible to local communities, as well as to Southern governments. In particular, those who stand to be affected must have the opportunity to participate in program design, impact monitoring, etc.

Institutionalized mechanisms are required for measuring "environmental debt" and reflecting it in a comprehensive system of international accounts. This, in turn, depends on defining an acceptable set of indicators of environmental change.

Finally, the links between environment and peace are strong. The role of international institutions in preventing war is key, as peace is essential to develop the regional cooperation that is required to build sustainability.

Knowledge Systems and Technology

All nations must participate in debates on the global environment as well-informed sovereign states. A two-way flow of information between South and North is crucial. Also, participation in global environmental debates requires greater research capacity within the nations of the South. It is critical that the Third World have access to the knowledge, skills, and technologies that will be vital in the coming decades. Currently, participation is militated against by a low level of research on environmental issues, as well as by repressive political environments.

Improve information flow and the balance of influence

If the countries of the South are to participate as autonomous nation states in the global discourse on the environment, they will have to form their opinions based on firm scientific understanding of the relationships between their national interests and global environmental needs. Research by indigenous scientists is key. In

addition, Southern research must have greater penetration and influence in the North.

At local, national, and regional levels, environment and population need to be linked through the concept of carrying capacity. Data bases for analyzing trends in resource quality, quantity, availability, and carrying capacity are needed. The kinds of interdisciplinary research that are required can only take place with increasing levels of cooperation between sectors and disciplines. Fundamentally, the social research required to understand the human implications of physical environmental change is weak, in both North and South. It is critical that long-term research efforts be linked to short-term needs and goals. The emphasis must be on clear priorities that make sense at the local level and over the short term.

Reorient resource management

Alternative development models require a strategy of natural resource management that minimizes burdens on basic resources — soil, water, forests — and minimizes the exploitation of scarce or sensitive resources. Some elements of such a strategy have already been suggested; in sum, it should

- Combine traditional knowledge and modern technology to improve productive systems and employ regional diversity;
- Integrate productive activities with ecosystem management to ensure the preservation of natural systems and processes; and
- Modify international policies of financing, pricing, markets, etc., to support the viability of production alternatives, and to allow producers to control and manage the productive process.

Perhaps more fundamentally, there must be a reduction in the extraction and production of many primary commodities.

Given the limits to renewability and the vulnerability inherent in overspecialization, achieving the required increments in production cannot be based on greater extraction of a few resources. The productive potential lies in diversifying the resource base. The potential for diversification in the Third World is in part supported by the fact that many countries of the South continue to

harbour very high levels of biological diversity. For example, original vegetation covers 42 percent of the surface area of Latin America, despite extensive degradation. The rich knowledge of different campesino and indigenous communities parallels the natural wealth and is expressed through traditional technologies that have evolved over many generations. These communities rely on a diversified use of natural resources and operate in harmony with the ecosystem, assuring sustainability. Research and management efforts by local resource users must be supported.

A broadened understanding of global responsibility for certain resources is also essential. For example, tropical rain forests, although concentrated in a few countries, benefit all humanity through atmospheric regulation and biodiversity. Therefore, if a country in which natural forests are currently logged for export decides to impose environmentally motivated restrictions on logging, compensation for financial losses that may be incurred should be a global responsibility. Similarly, it is the responsibility of "global consumers" to pay the full ecological and social costs of consumption in a world market where mineral and biomass products are available from distant lands, but are often produced and transported at high ecological and social cost.

Diversify technologies

Drastic changes are required in technologies and production processes. Traditional forms of resource use and traditional technologies were generally energy efficient and ecologically prudent, although their production levels and economic returns were often low. Modern production systems and technologies generally produce larger volumes of goods over time, but rely upon high levels of energy and other resource inputs. The result is a lack of ecological sustainability. The need today is to integrate the ecological wisdom of traditional practices and technologies with the production potentials made possible through modern science and technology, so that increased productivity can be obtained in an ecologically benign manner. Technologies to assist in determining ecosystem potentials and to manage land information are also essential. Investment flows must therefore not only promote growth but also attract technologies.

With respect to industrial technologies, in addition to reducing material and energy intensiveness, strict limits must be placed on

the use of toxic substances and hazardous technologies. Policies should be implemented to promote clean fuels, and subsidies for fuels that emit greenhouse gases should be removed. Codes of conduct for the transfer of technology are also needed.

Promote adaptive capabilities

The development of human resources should ensure adaptability in the face of the globalization of knowledge and attitudes. Also, a balance must be struck between globalizing forces and the maintenance of local integrity. By necessity, then, development approaches must be anchored in history and philosophy to ensure that the analysis and ultimate prescriptions are holistic and moral. Environmentalists and social scientists must work to provide relevant and balanced information, to undertake education and advocacy, and to assist people in developing new resources, technologies, and strategies.

Processes of Cultural Change

Efforts to ameliorate global environmental change should strengthen the capacity of peoples to sustainably use their natural resources according to their needs, skills, and aspirations, within the context of an environmentally conscious lifestyle. Values, attitudes, motivations, and capabilities are key, but are perhaps the most complex and difficult aspects of the global environment/development crisis. A systematic analysis of perceived needs and desires is necessary, as is an understanding of the ways people balance short-term and long-term goals.

Support cultural diversity

The rich variety of relationships that people have had with their natural surroundings are reflected in the diversity of cultures worldwide and in the wide range of religions, philosophies, ethics, values, and lifestyles that characterize these cultures. In general, communities directly dependent on the biophysical environment develop a strong respect for, and a sense of "rootedness" in, the natural world. Unfortunately, the integrity and influence of the associated social norms and values are deteriorating in the face of the dominant, consumption-driven, "throw-away" culture.

Global homogenization of culture and values must be counteracted by recognizing and supporting cultural diversity. Cultural diversity, like biological diversity, must be seen as a resource whose loss diminishes development potential. It may then be possible to foster an enriched appreciation of less material-intensive sources of human satisfaction and fulfilment. Whereas human demands on physical resources must be contained, personal fulfilment through nonconsumptive activities should be freely pursued. Also, in these times of rapid change and enormous pressures, a sense of cultural pride can act to protect ecologically adaptive traditional knowledge and skills.

Promote respect for nature

Individual, institutional, and societal appreciation of, and respect for, nature are essential foundations for a truly sustainable future. The values of many traditional cultures in relation to the natural environment are an important source of wisdom. A better understanding of the conditions that foster a sense of connection with nature is essential, so that these conditions can be promoted at the household level, in the school system, in the business community, and in the various other sectors and institutions responsible for shaping our values and our future. New parameters for development are needed that value the environment. Economic growth, as measured by GNP, per-capita income, etc., is completely inadequate in terms of expressing both environmental and equity concerns.

Promote gender equity

Environmental degradation leads to an excessive work burden on women, who play culturally determined roles of fuel, fodder, and water carriers in almost all Third Word societies. To ensure that women have powers commensurate with their responsibilities, as well as opportunities to expand their spheres of activity, gender equity is a value that must be widely adopted. Equity as measured by equal access to the control and use of resources does not come naturally; it must be part of a deliberate strategy. Increased participation of women in the economy and increased female literacy could be key to generating a demand for family planning, leading to the possibility of stabilized population growth. Experience in Sri Lanka and the Indian state of Kerala has shown

that female literacy is strongly linked to the processes of demographic transition. Thus, the population issue should be perceived, most of all, as an issue of women's rights and women's development.

PART II

Research on the Social Dimensions of Environment/Development Issues

Chapter 4

Roles, Problems, and Potentials

Clearly, researchers on social issues have a key contribution to make toward understanding the processes of planetary environmental change. In spite of this, the focus of development on rapid economic growth has neglected broad-based social research; research that is essential for sound planning. In a world dominated by commercialism, management, and administration, researchers on social issues have had little or no political or decision-making influence. The emphasis on the biophysical dimensions of change also reveals a bias toward technocratic management based on supposedly "hard" facts, facts acquired within a natural science framework. Environmentalists themselves have primarily focused on scientific data to build their arguments, reinforcing this bias in the popular mind. By both design and default, therefore, researchers on social issues in both the South and the North have been assigned a marginal role in defining and addressing global environment/development issues.

At the same time, social scientists have neglected or been inadequately informed about issues central to the global environmental debate. In fact, they frequently address issues that have important environmental implications, but are often not adequately aware of these implications. The environment has been seen primarily as the province of the physical and biological sciences; the social sciences have neglected to take adequate account of the interaction of environmental problems with socioeconomic structures.

There is increasing recognition that the roots of — and solutions to — environmental problems lie in social and economic institutions at local, national, and international levels. A solid understanding of social conditions and processes is key to successful development. Indeed, experience clearly indicates that many development initiatives fail not because they are scientifically or technically flawed, but because they do not account for the social, political, economic, and cultural systems within which they were meant to operate.

Thus, integrating environmental concerns with development planning, and the very concept of sustainable development, brings into focus critical social and economic issues. To acknowledge the essential role of social science research in development

planning is to accept that noneconomic factors are as important as economic goals. Social science research gives development a human face.

Roles of Social Research in the Environment/Development Context

The primary purpose of research on social issues is to understand human relations; it should clearly not be limited to an "academic" exercise. Analysis directed to problem solving, including the formation of social policy, is also legitimate and pertinent social research. However, conceptual and methodological development would be impeded if research focus was dictated solely by social problems and priorities. Moreover, given the pressing nature of environment/development problems, attention must be focused on bringing together basic and applied research related to environmental issues. Social research should also focus on means of enhancing cooperation between sectors and regions to develop shared understanding andgoals. Interdisciplinary sharing of information is one essential component.

The appropriate implementation of research is to be encouraged; but, this is not explicitly or necessarily the role of the researcher. Other actors must be involved in carrying the research through to practical application. Social work or activism that does not involve study, analysis, and the development and sharing of knowledge is not social research. Researchers may become involved in practical applications of the research, however, and this can enrich the research process.

Social science research related to environment/development issues can be conducted in both academic and nonacademic settings, and directly within the community, as action research. Indeed, social science research on these issues is not, and should not be, restricted to social scientists. Researchers from a range of backgrounds and disciplines should heed social issues.

Basic Understanding and Knowledge

The most conspicuous role of social research in relation to the environment/development crisis is to investigate the nature of relationships between social conditions, values and attitudes (motivations), human activities (primarily economic and

technological), and environmental quality. These investigations may contribute to developing the methods of research and analysis required to predict, prevent, or control environmental and developmental degradation.

Predictive Analysis

Social science also has a predictive or projective function. Such a role requires the formation of research frameworks and studies to project future trends. It may, for example, involve monitoring trends in socioeconomic behaviour and analyzing the environmental implications of these trends (for example, implications for resource use and probable consequences of predicted changes in resource use). Social research may also define probable responses in relation to particular sets of decisions and choices, and thereby help to clarify desirable options.

Policy and Institutional Analysis

Social research can broaden the policy and planning process in relation to environment/development issues to include considerations beyond those of an economic and technical nature. It can also address key social policy issues. For example, how should the burden of adjustments required for sustainable development be distributed between countries, between social classes within countries, and between current and future generations? Institutional analysis can contribute toward improving existing national and regional institutions. It can identify the need for new institutions and develop strategies for regional cooperation and regional environmental management.

Education

Social research should help to heighten the understanding of the philosophical and practical implications of environmental issues among all sectors. It is particularly important for local people to understand the environmental and related socioeconomic implications of both locally generated and externally imposed change. For example, developing comprehensive and accessible frameworks to analyze environmental change would allow nontechnical people to absorb and use the information. Also, social research should raise the awareness of decision-makers to the needs of local people, particularly those people who are highly dependent on their environment.

Advocacy and Empowerment

Social research should not only contribute to people's understanding but also enable their involvement and empowerment. It should help to stimulate the acceptance of responsibility by individual citizens, communities, and governments, as well as educational, religious, and financial institutions. Marginalized people in particular need tools to defend themselves against abuse and absolute poverty. Social research can help people to articulate their interests and needs before regional development plans and projects are implemented. Research should also promote respect for the spiritual beliefs and values of other cultures. Ultimately, the value of social research may go beyond describing existing beliefs, values, and attitudes, and actually stimulate their positive evolution.

As implied earlier, there is also a place for social research in proactively identifying alternatives for the survival and development of communities. An example would be alternative decision-making processes and structures that would enable local people to have more control over their natural resources, and to exercise that control democratically and in the interests of environmental sustainability.

Key Limitations and Problems

Although the wide-ranging environmental effects of human activities are now of acute concern, the social sciences — notwithstanding increasing sensitivity — do not reflect this concern in their scope of study. Many challenging conceptual and methodological questions have been raised in relation to the role of the social sciences in the environment/development arena. The expertise and insight of social researchers worldwide could do much to answering these questions.

Inherent Complexity of Environment/Development Issues

The relationships between people and their environment are inherently complex and many modern causes and effects are new to humanity. Human–environment interactions are multidimensional, often characterized by relationships that are reciprocal and random. Given the changing velocities of these processes, as well

as the changes in the type and intensity of their outcomes, an appreciation of historical relationships is essential.

Inadequacy of Existing Frameworks

At one extreme, it has been suggested that changes within social science paradigms — perhaps even fundamental paradigm shifts — are needed to make the social sciences relevant to environment/development problems. At the other extreme, the lack of knowledge about the social dimensions of environmental issues is seen to reflect the simple lack of attention that has been devoted to these issues. There is no consensus on the question of paradigms. However, the need for a new framework to address emerging interdisciplinary challenges has been frequently articulated, and some elements of this framework have been proposed. Unfortunately, there has yet to be a clear focus to galvanize the research community.

The lack of a specific conceptual framework for addressing environmental issues has forced researchers to depend on existing disciplinary approaches, although these do not correctly fit the complex, interwoven realities of human–environment relationships (see Box 12). In many cases, environmental issues are addressed by simply adding "one more variable" to an already existing analysis. The lack of a clear framework may also partly account for a certain "faddishness" in environment/development research. The focus shifts from impact assessment, to women in development, to resource-based analyses, with little real integration or coherence.

Lack of Interdisciplinarity

Perhaps the key limiting factor in most current research on ecological problems is the artificial and misleading isolation of the social and natural sciences, and a lack of tradition of interdisciplinary work by social scientists.

One sector that exemplifies the need for an interdisciplinary approach is agriculture. A critical set of policy issues relates to trade-offs between short-term and long-term productivity. Fundamentally, new criteria for efficiency are required. Complex questions arise regarding trade-offs in the use of hybrid seeds and pesticides and the roles of traditional and modern agricultural practices. Such issues cannot be left entirely to biophysical

Box 12

Examples of Disciplinary Limitations

Although it is difficult to establish whether a particular discipline's limitations are inherent to its theoretical structure or reflect the focus of its practitioners, it is clear that the dominant approaches in most disciplines have failed to adequately address the majorenvironment/development issues. Within the economics profession, for example, there is a preoccupation with variables (such as growth of national product) whose measurement excludes such key development/environment variables as the "hidden" contribution of women to the economy, the "downstream" environmental costs of economic activities, and the cultural homogenization often associated with economic development. In more recent years, the prevailing political orientation in the countries of the North — reflected in part in the rise of neoliberalism and a focus on static allocative efficiency and short-term stabilization measures — has tended toward unbridled faith in the market. This faith is maintained largely by underestimating the "externalities" of activities of producers and consumers, by ignoring the long-term implications of current economic activities, and by removing equity issues from the economic development agenda.

The sociology of development, another important intellectual discipline, tempers the growth centredness of economics by contemplating issues of equity, basic needs satisfaction, and social relations. Practitioners within this discipline are concerned primarily with issues such as ownership of productive assets, distribution of incomes, and factors affecting productivity. It is recognized that the unequal distribution of assets, incomes, and power are structural forces that result in inequitable, unbalanced development, regardless of the rate of economic growth. Nonetheless, as with economics, there is a prevailing belief in the desirability of economic growth and a disregard for the problems inherent in attempting to sustain this growth. A related dominant assumption is that technological modernization is desirable and positive. There is inadequate questioning of the ecological, social, and developmental consequences of interactions between humanity, nature, and technology.

scientists; they have major implications for economic policy, social policy, and development planning as a whole. Similar issues and policy dilemmas arise in all sectors, including industry, transportation, energy, housing, and health.

Despite the urgency, few researchers on social issues are attempting to come to terms with what "sustainability" means in the context of their work. Few are equipped with an operative knowledge of the different facets of the environmental crisis. At the same time, physical science analysis has not been adequately extended to include social causes, effects, and possible solutions to environmental problems. In sum, whereas the instruments of social science analysis are critical, the knowledge and tools of both the physical and social sciences must be combined to understand and resolve the environmental crisis.

Efforts are being made toward interdisciplinarity. For example, there is an increasing number of interdisciplinary programs in universities, as well as joint working groups and panels in a range of institutional settings. The increased sensitivity of development sponsors — largely because of pressures arising from project-specific impacts — is also stimulating an environmental focus in social research. Moreover, social research in the South has addressed issues associated with environmental resources and natural disasters. Nonetheless, the overall situation of disciplinary isolation has not greatly changed. Environment/development problems are too rarely analyzed within an integrated framework.

The results of unidisciplinary research can be disturbing. For example, many economists involved in environmental research take a quantitative and neoclassical approach; an approach that is promoted by many influential research sponsors. The resulting "solutions" tend to be antihumanist, their main thrust being increased privatization. The ongoing dominance of economic analysis in development decision-making is producing very real and disturbing effects. People traditionally reliant on their local environment are being disenfranchised in the name of environmental protection.

Decline of Equity Considerations

The preceding example reflects the dangers of addressing complex environmental problems without dealing with concerns of equity. In the 1960s and 1970s, most development research demonstrated at least some sensitivity to issues of equity. Equity must be reintroduced and reinforced as a central consideration in any research related to environment/development issues.

Inappropriate Units of Analysis

Social analysis is sometimes performed in relation to administrative regions and economic categories. Seldom, however, does it focus on particular ecological regions or natural resource boundaries. Despite some global commonalities in the appearance of environmental problems, the implications for each region are unique. This uniqueness is a function of distinct natural, cultural, and social conditions, which, together, determine the form in which people relate to and use their environment. In other words, regional conditions dictate the regional relevance of particular environmental concerns; they should thus be reflected in the design and focus of research activities. The global concerns associated with climate change, for example, are relevant worldwide. However, their relative priority in a given region would depend on the vulnerability of that region to climate change, the existence and perceived severity of other environmental threats, and the degree to which that region contributes to climate change. Thus, to understand the human dimensions of global environmental change, the causes and effects of global change must be examined from the regional perspective, regions being defined on the basis of environmental and developmental coherence.

CHAPTER 5
Challenges and Emerging Trends in the South

Challenges for Southern Researchers

One of the major barriers to social research on environmental issues in the South is that social scientists traditionally confine themselves to socioeconomic issues, detached from their biophysical framework. In a broader sense, there is a lack of interdisciplinary tradition. These are generic problems. There are several problems more specific to Southern research and analysis on environment/development issues, including data deficiencies, Northern domination, and institutional barriers. For the South to develop a distinctive and functional understanding of major environmental issues, both the generic and specific constraints on the role of the social sciences must be addressed.

Data Deficiencies

Researchers in all regions of the South face serious data problems. Compared with their Northern colleagues, Third World social researchers are at a great disadvantage: they lack the basic data necessary to analyze the social significance of environmental phenomena. Low research budgets have limited the acquisition and analysis of data and, to date, research capacity continues to fall far short of research needs. Resources for conducting primary research in particular are extremely limited. Moreover, much of the data that do exist are unreliable or outdated, and statistics are seldom in an appropriate form. These problems are compounded by the fact that considerable work on environmental issues is produced as consultancy reports. Such reports are usually not accessible to the research community — the underlying data is considered the sole property of the consulting firm or reports are classified confidential when considered controversial or embarrassing to the authorities. In some regions, the proportion of environment/development research that is caught in this "grey" literature is truly intolerable; in many cases, it denies people access to information that is fundamental to their livelihoods and futures.

Dominance of Northern Perspectives and Approaches

Southern social research on environment/development issues is, like many other areas of research, dominated by Northern perspectives. Many factors have promoted this domination, including

- Conceptual vacuums (lack of alternative ideas and perspectives) in the South, partly a reflection of the newness of many of the issues;
- Influences in the training and background of national professionals that foster uncritical adherence to Northern ideologies and methodologies; and
- The prevalence of Northern financial support and research facilities, through which selected hypotheses, approaches, and often conclusions are promoted.

Primary indicators of domination include an unquestioning acceptance of imported ideas, approaches, and interpretations, and their propagation through work carried out in the local or national context, irrespective of their true applicability. Based on these indicators, there is no doubt that the "dominant view" of global environmental issues is accepted to a certain extent by many Southern professionals. Both academic and state-supported projects have borrowed ideas and approaches from the North, and the associated views and interpretations often strongly influence conclusions and recommendations. However, Northern domination is far from absolute. As work progresses and higher levels of understanding are achieved, national professionals are able to develop their own perspectives on social problems, including global environmental issues.

To propose relevant and culturally respectful solutions, social research on environment/development issues must truly reflect local and regional culture and history. Traditional assumptions and approaches must, therefore, be challenged. However, a critical perspective on "Western" ideas needs to be articulated with caution. It has become a fad among many Southern scholars to label everything as "Western" and then decry it. This can lead to the curbing of what could be very useful research. Critics must rise beyond the level of repudiation and assist in developing an independent, alternate set of perspectives. Also, certain concepts and tools, although developed in the North, remain universal and

should be used without fear of domination. The challenge to Southern social scientists is to use these concepts and tools, adapted as necessary, to develop their own agenda and solve their own problems. Anti-Westernists should also beware of uncritical and unquestioned romanticism for the past. Several environmentally friendly technologies of the past — for example, manual grinding of grain — were also "women-unfriendly," placing excessive demands on women's labour.

Financial Dependence and the Research Agenda

Southern researchers rely heavily on Northern money. This makes it difficult for them to direct their efforts according to nationally or regionally relevant priorities. Thus, key areas of importance for the South are inadequately studied. For example, there is little to no Southern research on key Northern institutions and activities that influence environment and development globally and in the South, including the green movements in the North, which have potentially tremendous implications for Northern politics and, thus, South–North relations. The research agenda must be redirected toward greater self-generated understanding of both dynamics within the South and impacts of the North upon the South.

Large development institutions that commission or finance environmental research rely, in most cases, on their own experts. This is partly because of a real or imagined lack of local expertise and partly because consultancy firms in donor countries have often cornered the market on such work. Thus, when local specialists are involved, they often serve as subcontractors to donor-country consultancy firms. The division of labour in these contracts generally confines local research to gathering clearly specified data. Analysis is then done by the foreign consulting agency. Given economic conditions and poor salaries in many Third World countries, such subcontracts are sufficiently lucrative that they attract some of the best scholars.

Such contracts seldom lead to the production of academically respectable output by local researchers. The documents produced are rarely subject to peer review. Indeed, they are rarely even available to local researchers — they are often only circulated internally, considered for official use only, or even classified as confidential.

Lack of Influence of Southern Research

The challenges raised by the dominance of the North are related not only to the "decolonization" of Southern approaches to research and the establishment of research priorities, but also to the establishment and amplification of the influence of Southern research on policy formulation, globally, regionally, and nationally. Policies and programs of the major international and bilateral financing and aid organizations continue to be heavily if not exclusively guided by Northern research, regardless of the credible and often innovative research from the South.

In fact, although the extreme underrepresentation of Southern-generated analysis reflects the biases of Northern institutions, it also reflects the reality that Northern researchers continue to produce a much larger body of literature on the South than do Southern researchers! This is not to deny the existence of high-quality and important research from the South; rather, it emphasizes the need for more support for research by Southerners.

The Actors

Roles and Problems of Universities

In much of the South, environmental research, like most other areas of research, takes place primarily in universities. However, the relatively rigid boundaries of traditional disciplines have made it difficult for universities to embrace what is essentially an interdisciplinary subject. Thus, there are few universities where environmental issues — physical or social — have been integrated into existing programs and courses. Even though there are now special curricula and research programs in many universities to address biophysical environment issues, the social aspects of environmental problems have been largely neglected. Even where social issues are being integrated, the analytic approach generally remains weak. Where discrete interdisciplinary teaching and research programs on the environment have been established, their novelty and rarity tend to place great demands on the host institutions.

Beyond problems specific to introducing environmental studies in existing institutions is the crisis faced by these institutions as a whole. Grave economic conditions, compounded in many cases by austerity measures applied through structural adjustment

programs, are undermining the financial base of postsecondary institutions. Research programs — never a priority even in the best of times — are often most deeply affected. Universities are invariably overcrowded, and staff are demoralized by poor pay, inadequate equipment, and excessive workload. In many cases, laboratories and libraries have virtually collapsed. Environmental programs, therefore, become dependent on consultancy research commissioned by international funding agencies or NGOs — research that is often project specific, such as environmental and social impact assessment. The opportunity to undertake independent research oriented toward comprehensive and long-term analysis is uncommon.

Roles and Problems of NGOs

Increasingly, relevant environment/development research is taking place outside universities, particularly in NGOs. This is partly because of the inadequate response and research capacity of the universities and partly because nonacademic institutions and popular movements have a different set of perceptions and needs in relation to environment/development issues. In some regions, the NGO community has played a key role in initiating research on the environment and in shaping its major thrust; however, patterns and results differ from region to region. In some cases, NGOs with holistic approaches undertake sophisticated, credible research, whose relevance is often enhanced by integrating practical community experience. Indeed, the trend toward integrating environment/development analysis has been greatly stimulated by NGOs and social movements.

In other cases, however, there are notable shortcomings in NGO research. In many regions of the South, NGOs, like universities, depend on consultancy research and research sponsored by Northern-based NGOs. This reflects the fact that consulting is the only relatively steady and secure source of research funding. Whereas some research sponsors are sensitive to locally defined research needs or will allow the recipient organization a significant degree of autonomy in allocating funds, donor-driven research more commonly reflects the perspectives and needs of the donor organization. On the positive side, however, NGOs have wrested some environmental issues from domination

by consultants and have promoted greater media attention and public debate on the environment.

Given their typically "activist" positions, NGOs tend to work with local activists, although they are not necessarily the best local researchers. Also, many NGOs tend to adopt what are — intentionally or not — rather anti-intellectual positions. In many cases, the approach involves uncritical use of participatory research and rapid evaluation methods. Some of this sort of research is informative; however, it is seldom a basis for understanding the long-term needs and problems of an environmentally sustainable development process. These research efforts are far from exhaustive and need to be complemented by fundamental research.

NGOs in Southeast Asia and the Pacific

There are many NGOs and study centres in Southeast Asia and the Pacific that specialize in environmental issues. Also, NGOs working in related areas — for example, community development, basic needs satisfaction, health, and consumer issues — often undertake research into community-level environment/development problems that affect their main area of concern. The research undertaken by fledgling NGOs may be rudimentary and highly community specific; but, as experience and information build, so does the breadth, sophistication, and general applicability of the NGO research. The research generated or supported by NGOs, often based on action-research methods, is generally richly empirical and very grounded. Therefore, it is of great practical relevance.

There is a growing trend for NGOs in Southeast Asia and the Pacific to build their own research capacity, and an increasing number of professionally trained researchers and former university academics are joining NGOs as full-time research staff. Alternatively, academic researchers may work through NGOs. But, unless the research is commissioned or somehow controlled by the NGO, the experience may be frustrating and of limited advantage to the organization. Thus, where outside academic expertise is to be used, a combination of "in-house" research capability and directed input from university academics is most acceptable from the NGO perspective. Some NGOs in Southeast Asia have also helped to establish policy research institutes, which are free to undertake independent analyses.

NGOs in Africa

In Africa, local people are beginning to take over the development and environment research institutes and NGOs originally established by expatriates or outside agencies. However, there is little funding available for indigenously defined research priorities. With economic conditions and structural adjustment, government funding for research has all but dried up, leaving almost exclusive reliance on external funding. Foreign national and international environmental organizations have begun capturing research funds that were once the province of the universities. Funding from bilateral and multilateral agencies is also being diverted to Northern NGOs. Research efforts are therefore biased toward the particular and often narrow interests of foreign NGOs — for example, wildlife conservation — at the expense of compelling endemic needs, such as social research on the degradation of natural resources.

The research undertaken by NGOs in Africa is often rudimentary, project or community specific, and oriented toward short-term, quick-fix solutions. Given the urgency of the famine problem in Africa, for example, NGOs of non-African origin have focused on immediate, short-term, action-oriented "fixes." Although some of this research has grown in breadth, sophistication, and general applicability, in many cases its value and applicability remain limited. Indeed, some of this work can hardly be deemed research at all; it is more like filling in checklists. Moreover, because the intellectual demands of this type of work are quite low and the rewards are rather lucrative, many researchers are casually including environment in their list of specializations.

NGOs in Latin America and the Caribbean

In some countries of Latin America and Caribbean, risks of a degeneration in basic research capabilities and a distortion of research priorities arise from opportunistic responses to research funding. In this region, the amount of money available for environmental research has generally been increasing. Much of the money comes from research foundations and, in many cases, nationals have considerable authority in determining how the research money will be used.

A key issue, however, is who is capturing the funding. In most parts of Latin America and the Caribbean, research capability lies primarily with the universities. However, partly because of the red tape involved in funding public university research, foundations are increasingly channeling research money to NGOs and, in some cases, directly to communities. This may explain the recent proliferation of NGOs, some of which are one- or two-person operations that do not have a clear constituency. Some NGOs in the region have contributed significantly to the understanding of environmental issues; but not all have the capacity for disciplined, credible research. Thus, an entrepreneurial as opposed to scientific approach to research may prove detrimental to developing a comprehensive, integrated understanding. As elsewhere, consultancy firms are capturing substantial funding for impact assessment, which is now law in some countries. This again is pulling some of the best researchers away from the universities and generating an information base that is inaccessible to the research community and the public.

Government Research Institutions

Governments are also important direct researchers. In many countries, the state directly runs research stations, research centres, or policy-oriented think tanks. Such centres or institutions generally have some measure of freedom from typical public-service constraints, but are usually faced with three problems:

- A mandate that is limited to addressing those issues that the government deems relevant;
- Limitations on research freedom, even within identified areas, through restrictions on the kinds of themes that can be explored or through control over distribution of research output; and
- Financial constraints that often reflect a more generalized cutting back of the state.

Despite these constraints, government research institutions remain potentially useful sources of knowledge. A key challenge is to make the work of these institutions less bureaucratic, more transparent, and more accessible.

Foreign Research Institutions

Foreign research institutions play a critical role in many Third World countries. Some actually maintain research teams in the South. These researchers often do excellent work by international standards; but their "enclave" character tends to undercut the relevance of their work to local communities. In most cases, the research is addressed to issues identified by their home institutions, and the approaches used are not always appropriate to local situations. Furthermore, these institutions tend to integrate outward and have little local intellectual anchoring. Any interaction they do have with local intellectual communities is often sporadic and paternalistic.

For example, collaboration between the institute's researchers and their local counterparts is often marred by a division of labour in which the foreign researchers carry out the conceptual work and analysis and the local researchers are confined to gathering data. Such a division of labour does not contribute to creating local capacity to identify research areas, develop research methods, and analyze empirical results. In the worst cases, such research draws on local intellectual resources — human and bibliographical — without proper acknowledgment and with no obligation to communicate research results to the local community.

Role of Local People

Historically, local people have had limited access to information that would help them to perceive the significance of their actions in the global context or the implications of global dynamics on their own lives. Local people living at the subsistence level do, however, experience environmental change in a direct way and are usually aware of the causes. Although such knowledge may not derive from conventional scientific processes, it can contribute greatly to an understanding of environment/development dynamics.

In the past, local people have seldom had the confidence or influence to bring their experience and knowledge into "external" spheres of decision-making. Recently, however, local people in some regions have become increasingly active and empowered. This reflects the growth of communication networks and, in some

cases, is the result of environmental disasters. Examples include the emergence of women's groups in the Pacific islands to protest nuclear testing and the solidarity of indigenous forest dwellers against logging in Southeast Asia. Also, some very grassroots associations are forming to address basic situations and issues; in some cases, oral communication networks are quite effective at gathering and disbursing information. (The problem for more formal research organizations is how to tap into these networks.) Thus, traditional interests and knowledge are beginning to penetrate the research and decision-making establishments.

Themes and Trends in Research

Common Themes

Despite a widely diverse set of concerns and institutional orientations, there are certain broad themes that research in the South tends to emphasize. These can be contrasted with the dominant Northern perspectives.

In much Southern environmental research, nature–society interactions are key, in particular, the implications of environmental change for society. Even though Southern environmental research tends to address both intragenerational and intergenerational dimensions, "here and now" issues are central. Thus, predictions and recommendations focus on the short or medium term. Analytic approaches are relatively simple and are oriented to addressing change processes within current problem-solving modes. This increases the ease and potential of associating causes of, consequences of, and responses to change. In contrast stands the Northern tendency to focus increasingly on intergenerational issues, on long time horizons, and on impacts involving selected geophysical variables affecting the fundamental equilibrium of planetary systems.

Generally, Southern research also tends to focus on geographically discrete environmental changes; Northern research is dominated by more systemic changes. In other words, Southern research tends to focus on localized types of activity, where cause and effect are geographically close. Thus, an activity and its associated impacts do not cause change elsewhere. When widely replicated, however, such activities may, together, be enough to

affect the global situation. In contrast, systemic environmental change is essentially independent of the locale of its cause. Impacts resulting from an activity in a particular place may, independent of local effects, trigger system-wide adjustments. Global warming, largely caused by carbon dioxide emissions into the atmosphere, is an example of systemic change.

Research Topics

Taking Southern social research as a whole, some trends are apparent. Analytic and methodological social science skills are increasingly being applied to the problems of environment and development and to the management of human and environmental resources. The trend has been stimulated and primarily led by NGOs, social movements, and the researchers associated with them. This reflects increased contact among social action groups working on environmental issues through the growing number of information and activity networks.

Insights gained from this sharing of experiences and research have highlighted the degree to which international factors are at the root of many national and local environmental problems. Equity, environment issues, and the links between poverty and the environment are therefore emerging as subjects of increasing research and intense debate in the South. NGO researchers in particular are focusing more and more on these factors, and the findings are being used in discussions with representatives of international agencies, such as the World Bank, about the impacts of their policies and projects.

Another issue that is attracting considerable research interest in many Third World countries is the relationship between structural adjustment, debt, and the environment. This relationship takes two forms. One is the effect of strategies based on increased exploitation and export of raw materials implicit in adjustment strategies. The other is the problem of "environmental conditionalities" that are either being counseled or actually imposed. Research in Latin America has paid particular attention to these issues, and some research in Africa is also beginning to look at them. Related to this is the whole issue of "debt for nature" swaps. Problems of managing internationally shared natural regions (that is, the global commons and regions that straddle more than one

national jurisdiction), such as the Amazon, Antarctica, and the Pacific Ocean, are also attracting special attention among researchers in Latin America. In addition, Latin American researchers have paid particular attention to problems of genetic manipulation and the erosion of biodiversity.

For more than two decades, drought and desertification have been viewed as the major environmental challenge in much of Africa. Thus, it is not surprising that these problems have received more attention than any other aspects of environmental change. In this respect, many authors have sought to uncover the factors responsible and have advanced various hypotheses about the causes. The conjectures arising from such studies, however, are rarely substantiated with conclusive data. Also, in this large body of literature, direct and systematic treatment of the relationship between the changing patterns of natural resource use and global environmental change are rare.

Concerns related to soil erosion have also been prominent, perhaps most particularly the crucial role of land degradation in the agrarian crisis. On the technical side, range science is largely concerned with interventions to improve the land for cultivation (for example, rotational system, legume seeding, intercropping, riding and heaping, and ploughing and planting densities). Studies in agronomy and farming systems reflect a new sensitivity to the ecological values of traditional farming practices. It is now realized that most of these practices are environmentally sustainable and thus have enabled local peoples to cope, if not thrive, in their environment for centuries. In Latin America, questions of erosion have been conceived on the basis of large geographical areas such as the Andes, where erosion is a major concern.

The flood of recent discoveries of surreptitious toxic waste dumping in some countries of Africa and Latin America has generated heated — but rather unsystematic and uncoordinated — debate, mainly carried out in the mass media. These discoveries reveal the vulnerability to abuse of many Third World countries and highlight the lack of scientific and technological capacity for monitoring, detecting, and providing adequate information on most aspects of global environmental change.

Other issues that have been featured in the literature of the South relate to urban, industrial, and human settlement problems (for

example, urban decay, housing problems, industrial pollution, and population growth). The link between urban environmental problems and unprecedented rates of urban growth has stimulated research on the "push" factors of rural environmental degradation and the "pull" factors of urban life.

PART III

The Social Research Agenda and the Institutional Requirements

CHAPTER 6
Values, Principles, and Approaches

In developing the proposed research agenda — that is, in selecting and explaining key research themes and topics — we, the Commission, were guided by the values, principles, and approaches outlined in this Chapter. We believe that they should also guide all research efforts on environment/development issues.

Values and Principles

Attention to Equity and Poverty Issues

A review of environment research from the South reveals a recurring concern with matters of equity. This likely reflects the immediacy and saliency of intragenerational distribution issues and poverty in the South. As one of the highest priorities of development is to improve quality of life, the emphasis on equity must be maintained and reinforced in both identifying research requirements and in undertaking research. This point bears greater emphasis in light of the ascendancy and prevalence of approaches that either seek to expunge equity issues from policy analysis or, at best, relegate them to secondary, if not formal and token, considerations.

Attention to Democracy and Human Rights

An emphasis on the purely physical symptoms of environmental problems tends to encourage a technocratic view of both the problems and the solutions. However, to the extent that environmental processes affect and are affected by human actions, they are linked to politics and, therefore, to issues of values, power, and governance. Thus, in determining the focus of research and conducting the research itself, particular attention must granted to issues of basic human rights, as well as the decision-making methods and the distribution of power in society as these affect environmental processes or responses to these processes.

Related to this is the question of national sovereignty and the rights of nations as enshrined in various international charters. The global nature of many problems will likely require that global monitoring and regulatory agencies be established. This will

almost invariably entail a "surrender" of some aspects of national sovereignty. Respect for both human rights and the rights of nations to sovereignty means that accession by nations and their citizenry to international agreements on environmental monitoring must be voluntary and democratic. Research on the environment will have to be sensitive to these rights.

Gender Sensitivity

Our point of departure — the human dimension of global environmental change — calls for an agenda and a research approach that is gender sensitive. Even though studies on "women and environment" have sensitized the research community to the differential impact of environmental processes on women, they have been carried out in a "ghetto" of their own and are often merely perfunctorily appended to principal analyses. In addition, such studies have tended to be confined to areas that, through gender bias, have been designated as female economic activities — namely, those related to subsistence and family. As a result, gender considerations are usually not adequately represented, if at all, in such areas as economic policy and environmental management. Researchers, when elaborating proposed research themes, must consciously and meaningfully consider the gender dimensions of the topic at hand.

Approaches

Interdisciplinarity and Process Orientation

Environment/development issues are, by definition, complex. As well, the entire mosaic of interactions between human societies and their environments can vary over different historical periods. These realities make it essential to articulate and explore development/environment issues within an interactive, interdisciplinary, spatial, and temporal framework.

In applying this analytic approach to human–nature interactions, the human environment can be perceived in two broad categories: the natural environment and the socioeconomic system. The two continually interact through numerous feedback loops. The socioeconomic system itself is a mosaic of the technological, cultural, economic, political, legal, and administrative subsystems of a human community inhabiting a specific natural environment.

These subsystems are intimately interconnected and determine the pattern of a human community's interaction with its surrounding environment. A human community may overexploit its natural environment, causing it to deteriorate. But, as the two are joined through a feedback loop, the deterioration of the natural ecosystem will ultimately damage the socioeconomic system.

The human–nature interactions of a particular community are further affected by interactions with external human communities. Through economic exchange and the transfer of knowledge or technology, cultures living in different natural environments within the same nation will interact. Cultures from different nations may interact either indirectly through economic exchange, the transfer of knowledge or technology, and the spread of foreign lifestyles, or directly through political domination (as in the days of colonialism) or economic domination (as a result, for example, of heavy indebtedness and externally imposed conditions).

What does this mean for research? Environmental processes are both physical and social, and occur over time in a multifaceted and complex manner. As such, they can only be fully grasped if the strengths of various disciplines are applied — not in fragmented and compartmentalized ways but as part of an integrated approach. To capture both the global and historical nature of environmental change, such an approach must be temporally and spatially comparative. In other words, it must be sensitive to the differential impact of environmental processes on different physical and social spaces, and it must seek to understand their dynamic evolution over time.

This is not to deny the special competence of each discipline. Nor is it to deny the fact that certain themes are more amenable to research in one discipline than in another. Rather, it is to insist that disciplinary competence can only be brought to full potential within a consciously interdisciplinary framework. The dialectical and synergetic interplay of different disciplines will not only promote an holistic perception of the environment but will also enrich individual disciplines. In developing the research agenda, our commitment to an interdisciplinary approach is clear. Not only is it reflected in the way that the specific research topics are articulated, but also in the organization of these topics within integrative issue areas or themes.

Focus on Regional and Local Perspectives

By its very existence and composition, the Commission highlights the importance of exploring the causes and effects of global environmental change from regional perspectives. In developing the research agenda, we have attempted to allow for the flexibility necessary to address the tremendous variations between regions — variations in terms of biophysical conditions, levels of material development, sociopolitical systems, cultures, human interactions with the physical environment, the environmental impacts of different lifestyles, and the ways that environmental problems manifest themselves. Research that captures regional and local perspectives and experiences with respect to environmental issues is essential. This will not only help to correct the currently skewed perception of global environmental problems (favouring Northern concepts and concerns), but will also capture the full complexity and variety of the impacts of global environmental changes and ensure a sensitivity to local conditions and needs.

Attention to Global and Transboundary Dimensions

We have explored, in some detail, the international causes of key environment/development problems. Attention must also be given to the ways in which environmental problems manifest themselves both internationally and globally. Environmental impacts on the global commons are one category. The more general case involves any of a wide variety of environmental problems with transboundary dimensions.

Global commons, defined by lack of national ownership, include Antarctica, outer space, the deep oceans, and the atmosphere. Threats to the commons may originate primarily in particular regions, but impacts may be felt globally, and the severity of effects on humans does not correspond to culpability.

For example, although some regions of the world bear a much greater responsibility for the climate changes now occurring (being the major consumers of fossil fuels and the major beneficiaries of deforestation), the environmental repercussions will be experienced worldwide. However, the nature and severity of human experience of the environmental repercussions will vary greatly (see Box 5). Ironically, it is the least culpable countries

that often will be most affected by environmental impacts and the resulting societal impacts and human devastation. This is primarily because of their lack of capital to invest in infrastructure and technologies to cope with environmental and societal change.

There is also a wide range of transboundary environmental problems, including transboundary (but not global) air pollution (acid rain, for example), transboundary trade in toxic products and waste, transboundary impacts on water quality and quantity, and international tourism.

CHAPTER 7
The Research Agenda

Research Themes

The research agenda is structured around three sets of physical environment issues, and five social issue areas. A "cause and effect" analysis of the three physical issues can be pursued by analyzing the social dimensions within the five social issue areas. We believe that these eight issues provide a reasonably straightforward, comprehensive, and interactive set of themes, covering the key dimensions of the environment/development crisis.

Physical Environment Issues

Resource depletion and degradation

Resource depletion and degradation are associated, either directly or indirectly, with primary resource exploitation or with activities and infrastructure — such as those connected with urbanization, transportation, and international tourism — that extend over land and water, and thereby affect or encompass associated resources. Impacts include losing productive lands or habitats through competitive uses, erosion, loss of fertility, etc.; decreasing stocks of nonrenewable resources; declining populations and yields of species; and losing biodiversity through species extinction or reduction in intraspecies diversity. These human-induced losses translate into a reduced potential for development, particularly sustainable development.

Resource problems may be depicted in sectoral terms.

- **Land and soils:** Land scarcity reflects the intensity of competing uses and, in particular, the pressures of urbanization and cash cropping. In many regions, food crop production and traditional uses of the forest and other natural systems are under severe and mounting pressure. Loss of fertility and erosion of soils are coincident problems.
- **Water:** Increasing water consumption in a wide variety of sectors — especially urban, agricultural, and industrial — is severely depleting surface and groundwater resources in many regions. Indeed, water supply is increasingly becoming

a major source of conflict, perhaps most strikingly, in the Middle East (although in some regions, water scarcity is as much a reflection of pollution and salinization as of overconsumption). Watershed disturbances from forestry, agricultural, urban, and other uses are variously resulting in problems of siltation, increased runoff and flooding, and reduced water catchment. In coastal areas, the destruction and deterioration of buffers between land and water (reflecting the assumption that such areas lack economic value) is resulting in erosion and declining water quality.

- **Biodiversity:** Plant and animal populations are being depleted and destroyed through direct exploitation and habitat destruction resulting from activities in other sectors (in particular, the exploitation of forests). Erosion of intraspecies genetic diversity is also provoked by trends toward using a very limited number of varieties in agriculture.
- **Forests:** Commercial activity is a primary cause of the depletion and damage of forests. There are also associated impacts on soil, water, biological richness (number of species and species populations), climate, as well as forest dwellers and other communities.
- **Aquatic habitats and fisheries:** Mangroves, wetlands, coral reefs, and other highly productive and sensitive aquatic environments are being directly destroyed through land reclamation and urban industrial development. Indirect damage results from a variety of pressures causing coastal erosion. The loss of productive potential in these systems is reflected in declining fish stocks. Direct depletion of fish stocks is primarily related to commercial overfishing and the use of inappropriate technologies, like trawlers.
- **Energy resources:** Rates of energy production and consumption are rapidly depleting petroleum and other fossil fuels. Hydroelectric production degrades aquatic systems and often affects the availability and productivity of land.
- **Other nonrenewable resources:** Mining activities are depleting many minerals, including base and precious metals, as well as qualitatively and quantitatively ravaging lands and habitats.

Pollution, contamination, and toxicity

Problems of pollution, contamination, and toxicity derive from different aspects or stages of the same activities responsible for resource depletion and degradation. Key sources of impact are extractive and industrial activities, energy production and consumption, urbanization, agriculture, and transportation. With over 100 000 chemical substances in commercial use worldwide, pollution and chemical hazards are omnipresent. Toxic chemicals (including wastes) are associated with industrial production and industrial (pharmaceutical, agricultural, textile, etc.), commercial, and consumer use.

Impacts include the degradation of water (including surface water, groundwater, and oceans), air and atmosphere, and land and soil resources, as well as radiation and noise pollution. These impacts disrupt ecosystem functions, reduce ecosystem productivity and fertility, threaten human health (including increased morbidity, mortality, and developmental handicaps), and provoke atmospheric change (including ozone depletion and global warming).

Occupational, public, and consumer health threats arise from the production and sale of unsafe products and the generation and inadequate disposal of toxic wastes. Such problems are particularly virulent in the Third World. The threat of contaminating the resource base (water, soil, etc.) is also greater in jurisdictions where regulatory capability is relatively low. Less dramatic but more insidious than acute toxicity is chronic, generalized ecotoxicity — where the life-support systems of living organisms become toxic not as a result of a specific chemical but because of the complex interactions of many chemicals within the environment. New and emerging technologies, including biotechnologies, pose new, less understood types of hazards.

Natural disasters

The natural disasters of extreme climatic events — hurricanes, tornadoes, tropical storms, floods, droughts — and tectonic movements — earthquakes, tidal waves — have the potential to take a massive toll in both human and environmental terms. Many regions of the South are already prone to a variety of natural disasters, including hurricanes, storms, drought, and flooding. The

human costs of such events in the Third World are frequently devastating. While conventionally defined as "natural," the frequency and severity of at least some of these phenomena appear to be increasing as a result of human activity. In particular, global warming appears to be associated with greater frequency and severity of climate-related disasters.

Social issue areas

The five social issue areas correspond to the elements of a fair and sustainable order articulated in Chapter 3. Thus, they forge a link between the research agenda and our analysis of the necessary orientation of the global development/environment debate. Following each issue area are the key dimensions for research.

- **Poverty, affluence, and needs:** Inequality; poverty; affluence and overdevelopment; basic needs issues; population and resource use.
- **Economic order and development patterns:** International economic realm; national development models and styles; market mechanisms and the environment; economic–ecological valuation and development theory.
- **Political order:** International political order; role of the state; democratization, participation, and accountability; gender; legal and regulatory systems; conflict over natural resources.
- **Knowledge systems and technology:** Traditional knowledge and technological systems; modern science and technological systems; appropriate technologies.
- **Processes of cultural change:** Cultural diversity; homogenization of cultures; values and ethical systems; education and media.

The Interactive Research Framework

The framework of the research agenda is presented in Figure 1. The key physical problems that must be understood are placed in the central box; the five social issue areas are positioned around this core to highlight the cause and effect dynamics between the two.

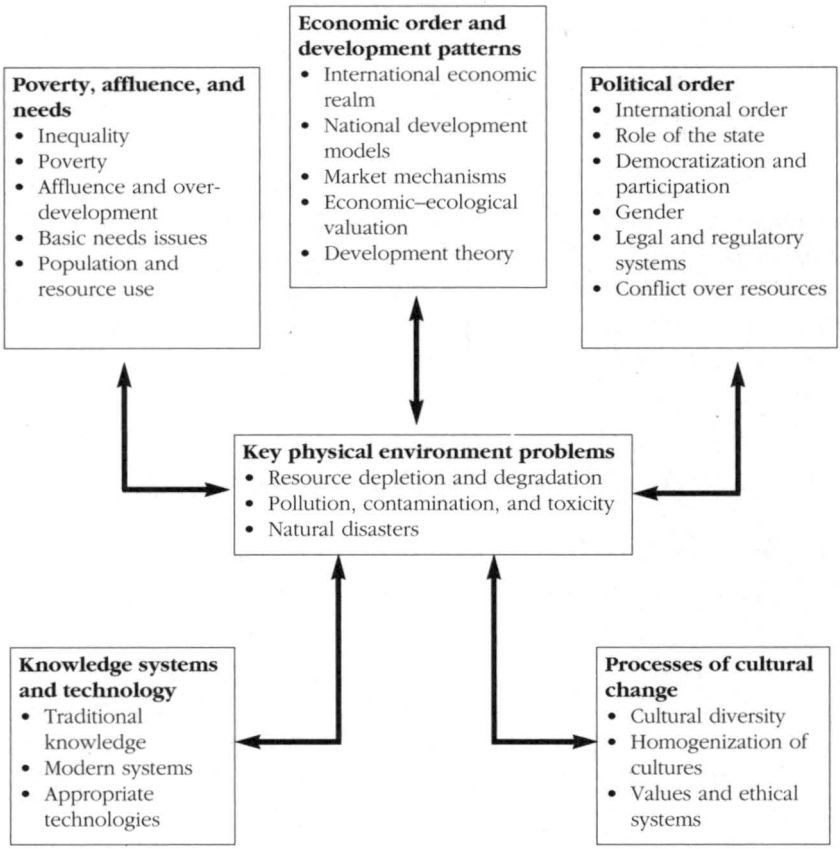

Figure 1. Framework for the research agenda.

Our approach has two related implications for social research. First, researchers on social issues are encouraged to take key environmental problems as a point of departure and to contribute to holistic analyses of their social causes and effects. Second, social researchers are encouraged to deepen or widen the areas of their research in the five social issue areas (poverty, politics, economics, technology, and culture) by being sensitive to environmental issues. In other words, the research agenda is framed in a manner that encourages research into the social dimensions of environmental issues as well as the environmental dimensions of social issues.

Chapter 8
Research Topics and Research Support

The list of research topics presented in this Chapter is far from exhaustive, and the thematic organization is not definitive. A range of alternative themes can be envisaged; but overlaps in the research topics would be virtually unavoidable and, indeed, overlaps between research themes and research topics reflect the inherent relatedness of the issues. Most research topics can be pursued at various geopolitical levels (local, national, regional, and global).

Theme: Poverty, Affluence, and Needs

Topic: Inequality

Relationships between socioeconomic inequities and environmental problems

- Relationships between socioeconomic inequalities (in wealth, asset ownership, access to land and income, education, etc.); overconsumption on the one hand and poverty or basic needs problems on the other; and environmental problems.
- Structures of social inequality that contribute to poverty and to the poor's inability to have harmonious relations with the environment: a key example is landlessness and lack of land security, which, in some countries, puts pressure on the poor to destroy forests.
- Ways in which environmental problems exacerbate social inequalities (in income, health, opportunities, access to resources, etc.) and differences in the ways various socioeconomic groups experience or are affected by environmental degradation; factors influencing these differences.

Topic: Poverty

Relationships between poverty and environmental conditions

- Environmental problems that create or exacerbate poverty and mechanisms by which this occurs.
- Implications of poverty for modes and levels of resource exploitation.

- Ways in which rural poverty affects efforts to protect natural areas and efforts related to environmental protection and conservation in general.
- Implications of poverty and joblessness in terms of ability to adapt to environmental change.
- The economic, social, and cultural rights of the poor, and violation of these rights in the process of "development"; the phenomenon of environment migrants and refugees, forced evictions, etc.
- Impacts of development projects and associated environmental problems on communities: sources of livelihood, access to land, level of self-sufficiency, etc. Specifically, for each sector and for each resource, what communities stand to be affected by environmental problems and how (in terms of socioeconomic status, health, quality of life, etc.). For example, in relation to forestry, what are the impacts of deforestation on indigenous peoples and on farm communities (related to soil erosion, water pollution, etc.)? In agriculture, which farmers are most affected by problems relating to pesticides, pest control, water contamination, etc.? In fisheries, which groups are facing the most serious threats related to reduced catch, damaged nets, etc.? In industry, who are the workers most affected by occupational hazards, and which residents face the threats of emissions, effluents, or wastes from local factories?
- Potential economic benefits of policies, programs, and projects versus socioenvironmental costs, including implications in terms of social equity (who benefits and who suffers?).
- Approaches to ending the cycle of poverty and environmental degradation (for example, enhancing rural employment opportunities and income diversity).

Topic: Affluence and Overdevelopment

Environmental and resource implications of overdevelopment

- Manifestations and explanatory mechanisms of overdevelopment and unsustainable lifestyles, including links to income inequality and to the systemic need to generate growth and effective demand.

- Environmental effects of overdevelopment and maldevelopment, including their role in global ecological stress.
- How to deal with unsustainable consumption and how to share the adjustment burden.

Topic: Basic Needs

Relationships between satisfying basic needs and environmental conditions

- Effects of pollution, resource degradation, and resource scarcity on basic needs (food, water, housing, health, and safety), especially of the poor; what are the environmental health problems (including home safety and product safety) and who is experiencing them?
- The urban social and environmental crisis: causes, manifestations, and solutions.
- Alternatives for squatters and urbanites unable to meet basic needs.
- The social and environmental costs of transportation, especially the costs of private motor vehicles, and alternatives for private and public transportation; implications for transport policy.
- Ways in which environmental problems are exacerbated through inadequate social planning and social services, including the following: environmental impacts of the lack of social infrastructure and social services for the poor (for example, lack of sewage treatment or proper waste disposal, leading to water pollution); the lack of resources and planning in social sectors such as housing, urban layout, transport, health, and garbage; and inadequate governmental and employer attention (resources, regulation, enforcement) to occupational safety and environmental controls.
- Appropriate methods for providing social services to fulfil basic and human needs (for example, food, nutrition, water, sanitation, health, housing, and transport).
- Entitlement to food, shelter, health, and education as basic human rights; implications for development and environment policy.

Topic: Population and Resource Use

Relationships between population characteristics, types and levels of resource use, and environmental conditions

- Links between environmental stress and population size on the one hand, and, on the other, between environmental stress and the consumption levels and styles of resource use of various income and occupational groups.
- The complex interlinkages between population, family size, poverty, inequities, gender relations, and environmental problems: which way does causation run, etc.?
- Relationships of local inhabitants to the local environment and resource base in rural, semi-urban, and urban areas.
- The carrying capacity concept in relation to population, environment, and development.
- Characteristics and requirements of a biomass-based subsistence economy; economic impacts on this subsistence economy resulting from environmental degradation and environmental transformation caused by the penetration of the "formal" economy; relationships between subsistence livelihoods (fishing, gathering, food cropping, etc.) and environmental quality; the marginalization and impoverishment of groups dependent on natural resources as a result of ongoing economic and social development.
- Social implications of population policy options, such as top-down "population control"; democratic family planning in conjunction with overcoming poverty and increasing educational and economic status of women, etc.; elements of an appropriate population policy.
- Population, health, and women's rights, including the impact of reproductive technologies on women's health and the safety of various contraceptive methods.
- The implications of AIDS (acquired immune deficiency syndrome) on health, demographic, and social policies in the South.
- Implications, in different socioeconomic structural contexts (for example, land-distribution patterns), of demographic growth on resource use and the provision of social facilities and employment opportunities.

- Environmental impacts of demographic mobility and vice versa.
- Alternatives to rural–urban migration (for example, by improving living conditions and opportunities in rural areas).
- Requirements for, and social costs of, relocating coastal human settlements (especially slum areas).
- Regional and global implications of increasing demands for, and use of, energy.

Theme: Economic Order and Development Patterns

Topic: International Economic Realm

Relationships between international economic factors and environment/development pressures and problems

- Identification and analysis of international factors causing national environmental problems: international trade and investment, including patterns and divisions of world production and trade, terms of trade and prices for Third World commodities, rules governing world trade in the GATT, and bilateral trade relations; actions and powers of TNCs; indebtedness; structural adjustment; and transfer of development models.
- Environment/development issues related to the new international economic order; impact of economic globalization on the environment.
- Impacts of globalization, economic liberalization, external indebtedness, structural adjustment programs, and declining terms of trade on patterns of resource use, related environmental pressures, and capacity for environmental protection.
- Environmental implications of the overall flow of financial resources from South to North and North to South, including implications for capacity for environmental protection.
- Environmental impacts of the World Bank, multilateral aid programs, commercial banks, and international agencies such as FAO, GATT, and UNDP.
- The role of TNCs in environmental degradation: practices regarding use of toxic substances, sale of unsafe products,

disposal of waste, promotion of unsustainable lifestyles, exploitation of and damage to natural resources, etc.

- Environmental implications of international tourism.
- Third World efforts for fairer North–South economic relations and lessons from experience to date.
- Implications of, and options to satisfy, the emerging need for global environmental agreements to address the impacts of international economic relations.
- Forms of, and approaches to, reforming international public institutions (for example, GATT, IMF, multilateral banks, and UN agencies) in relation to the needs of the environment and development.
- Appropriate policy packages and instruments to deal with Third World resource and environmental problems that result from indebtedness, structural adjustment, declining terms of trade, etc.
- Mechanisms to ensure that Northern nations share environmental costs associated with trade and export policies.
- Approaches to environmental regulation of the practices of major private economic enterprises (forms of regulation, mechanisms of enforcement, etc.).
- Impact of environmental conditions on economic and environmental management in Southern countries.

Topic: National Development Models and Styles

Relationships between national approaches to economic development and environmental quality

- Economic development approaches and general characteristics of the economic practices of the countries of the North, in terms of their implications for global and regional resource use and environments.
- Reasons for, and environment/development implications of, Southern adoption of dominant Northern development models.
- Structural similarities in the ways in which the impacts of global change manifest themselves regionally.

- Environment/development implications of explicit and implicit principles and priorities in development planning and economic policies that stress short-term economic growth and commercial interests; pressures on decision-makers to focus primarily or exclusively on economic potential.
- Relationships between distribution of income, ownership, and control of economic assets; patterns of production and consumption; and environmental impacts.
- Environment/development issues related to specific economic sectors, including transportation, agriculture, forestry, fisheries, mining, industry, tourism, urbanization, and construction.
- Current relations between human labour, natural resources, and technology, and their implications for sustainable development strategies, including adequate levels of employment in sustainable livelihoods.
- Development implications of economic expansion based on resource depletion; short-, medium-, and long-term effects of resource depletion on employment, revenue, exports, balance of payments, etc., and impact of resource scarcities on cost and availability of production inputs and capital goods; implications of economic dislocations caused by resource scarcities for national policies relating to foreign trade.
- Specific economic effects of environmental problems, including ecological degradation caused by development projects; economic costs of disruptions or dislocations of local communities as a result of pollution, industrial siting, tourism, adverse effects of new technologies, etc.; economic effects of increasing pollution and toxic waste (rising costs for treatment or safe disposal, effects of ailments on labour productivity, etc.).
- Economic losses and impacts on agricultural productivity and potential as a result of losses in biodiversity, soil nutrients, indigenous knowledge, etc.

- Requirements for transition to sustainability in the North, including alterations to unsustainable patterns of production and consumption, and their implications for the South.
- Strategies for incorporating sustainability into economic growth programs with special relevance to developing countries: that is, presenting the economic content of an alternative development strategy.
- Impetus and mechanisms for developing and adopting development strategies based on local values and technologies; economic and social policies to support and promote sustainable modes of production based on the recognition of diversity and the goal of integrated resource use.
- Resource potentials, state capacity, and social, technological, and financial conditions required to support endogenous development; the viability of such a development path in the current world order.
- Economic (including employment) impact of microexperiments in environmental regeneration and management; translating the lessons into alternative national policies.
- Approaches and mechanisms to incorporate environmental considerations in sectoral policies; appropriate forms and combinations of regulatory and economic instruments for increasing industrial, social, and individual environmental responsibility.
- Mechanisms for national appropriation of technological development as an instrument of development.

Topic: Market Mechanisms and the Environment

Environment/development implications of the "free" market

- Contradictions between sustainable development and neoliberal strategies, including self-regulating market, domination of the price system, and downplaying of state action.
- The role and impacts on environmental conditions in Third World countries of the international market, competition among firms, and monopolistic or oligopolistic structures.

Topic: Development Theory and Economic–Ecological Valuation

Environment/development implications of development paradigms and ways of assigning value to environment and resources

- Analysis of paradigms of development, including the concept of development as economic growth; changes in rationality implicit in new models of development.
- Explicit and implicit assignment of economic value of natural resources; impacts of undervaluation of ecological resources.
- Revisions of interpretive approaches to development, especially traditional paradigms with respect to demography, poverty, the market, and the state.
- New paradigms of development that incorporate environment, needs fulfilment, and equity at local, national, and international levels.
- Integration of social science frameworks in quality of life concepts and models.
- Means of incorporating environmental considerations in quality of life indicators; tools for integrating environmental considerations into economic cost–benefit analysis of development projects and the measurement of national economic growth and development.
- Means of more accurate costing of the values of a clean environment, and the need for cost–benefit analysis that accounts adequately for ecological functions; appropriate Third World methodologies for valuation of environment and resources.

Theme: Political Order

Topic: International Political Order

Environment/development dimensions of international relationships

- Environmental problems with international transboundary dimensions (for example, atmospheric pollution, nuclear power and weapons, transboundary resources, transboundary movement of waste, international tourism, voluntary and involuntary migration, biotechnology, and loss of genetic diversity).

- Environmental problems requiring North–South and general international agreements (for example, sharing of responsibilities and burdens to resolve environmental problems, questions of national sovereignty in relation to natural resources, enforcement of international policies, reform of international institutions, regulation of TNCs, and intellectual and technological property rights).
- Reassessment of North–South relations in general, particularly in political and economic areas, as a basis for developing international-level agreements on resolving environment problems; existence and implications of lack of influence of the South in global fora and negotiations in various areas including politics and economics; related barriers to the promotion by the South of its interests in relation to equity and globally fair environmental protection.
- Impacts on civil society and implications for sustainable development of neoliberal models, democratic transitions, new social agents, neocorporatism, etc.
- Issues related to the global commons that reflect the interdependence or asymmetry of international relations; legal aspects of defining and managing the global commons.
- Political aspects of biodiversity and biotechnology; mechanisms to prove and to ensure recognition of Third World contributions to global knowledge, as leverage for greater equity in the distribution of benefits; demonstrations of interdependencies to foster global solidarity; mechanisms for negotiating in situ conservation and national control of biodiversity.
- The nature and influence of both "green" political parties and nonpolitical environmental movements in the North and the political implications of their growth for the South.
- The character of environmental coalitions among the countries of the South and the implications of their growth for countries of the North and South and for international relations.
- Political and environment/development implications of reduced powers of governments of the South as a result of the dictates of international agencies, TNCs, etc.; the related general propagation of an open-market system.

- The political and legal implications of the global environmental conventions being proposed and the use of aid, trade, and debt as political levers for changing environmental behaviour in countries of the South.
- Implications of international treatment of the principle of national sovereignty in relation to natural resources and to ecological problems, including those with transboundary effects.
- Enforcement of environmental policies in the international arena (who has the right and, in reality, who has the power?); roles of the UN Security Council, the General Assembly, the major powers, etc.
- International conditions conducive to the transition to environmentally sound development in the Third World.
- Basic principles on which to base agreements on responsibilities, burden sharing, financing, etc., related to sustainable development.
- Negotiating mechanisms for formulating international environment/development agreements, particularly between countries of the North and South; international mechanisms for settling environmental disputes.
- Design and implications of legal, financial, and other programs of internationally shared environmental action, including institutional arrangements related to coordinating planning and implementing programs for environmental protection and economic reform, and strategies for managing the global commons to control emerging problems such as global warming.

Topic: Role of the State

State policies and actions affecting or affected by environment/development issues

- State policies contributing to environmental problems.
- Political implications of unsound development models and related environmental problems, including redefined notions of sovereignty.

- Existence and adequacy of legislation and enforcement regarding environmental protection and the rights of people to secure livelihood, food, health, shelter, etc.
- Relationships of the state, TNCs, and national corporations with respect to the depletion and degradation of natural resources; exploitation of natural resources at the expense of the territory and rights of local communities.
- Systems of corruption, monopoly, and misuse of power, and improper linkages between political and business interests; implications for the legislation, regulation, and management of natural resources, and for environmental protection.
- Social and political conditions necessary to fully integrate social issues, environmental issues, and ecological options, at all levels of government decision-making, in planning and implementing sustainable development.
- Mechanisms for national control of technology as a tool of development and for the use of environmentally sound technologies.

Topic: Democratization, Participation, and Accountability

Environment/development implications of varying levels and styles of democracy

- Environment/development implications of varying degrees of political freedom and varying degrees of political space for social movements, local communities, and NGOs to contribute toward ecologically sustainable solutions.
- Implications of the nonrecognition of people's rights (rights to livelihood, food, health and safety, clean environment), including the marginalization and impoverishment of groups dependent on natural resources as a result of ongoing economic and social "development" processes; implications of suppression of, or lack of mechanisms for, the influence and participation of local communities, women, NGOs, and other public interests in decision-making related to development policies, programs, and project implementation.

- Political responses to resource scarcities and environmental degradation; tendencies toward centralization of power, and implications for individual and collective rights; risks of intensification (by the state or other vested interests) of repressive measures as problems increase.
- Impacts of NGOs on environmental issues, including acquisition of financial resources and execution of actions.
- Increasing influence of environmental public interest groups as a result of the growing intensity and explicitness of environmental problems; related opportunities for social, environment, and consumer groups to play a more effective role in advocating environmentally sound development policies.
- Environmental implications of state reform, democratic transitions, social participation, and the revaluing of traditional cultures.
- Criteria for sociopolitical systems that create positive conditions for environmentally sound development, that are equitable, and that satisfy basic needs.
- Public participation in planning, implementation, and control of development: strategies, models, and mechanisms for cooperation and equitable, participatory decision-making to ensure local community participation in environmental management.
- Mechanisms for, and implications of, returning or preserving local control of local resources as an option for protecting the environment with social equity; nature of laws and institutions needed to increase people's control and management of their immediate natural resource base.
- Characteristics of successful community initiatives to resolve environmental problems.

Topic: Gender

Role of women and implications of the repression of women in relation to environment and development

- Women's perceptions of, and dependencies on, the environment; women's roles in environmental change; women's roles in resource and environmental management.

- Time-use studies of women's work in relation to natural resources and the environment.
- Gender perspectives on current development processes and associated natural resource exploitation processes.
- Impacts of development processes and associated environmental stress on women's health, economic position, and status; impacts of development processes and resource and environmental degradation on women's roles in food production.
- Nature of institutions needed to empower women in environmental management and mechanisms to develop more gender-balanced decision-making in environment/development policies.
- Ways of improving women's rights and freedom in terms of decisions regarding reproduction.

Topic: Legal and Regulatory Systems

Relationships between regulatory regimes and environmental protection

- Manifestations and implications of state and institutional weakening and the related loss of regulatory capacity and control, in relation to environment, natural resources, and territory.
- Causes and consequences of inadequate state legislation and policies for environmental protection; environmental impacts of inadequate legislation, ineffective enforcement, and corruption.
- Characteristics of national environmental protection agencies in the South; implications of the absence or inadequacy of environment units within key government agencies, such as economic development or planning agencies.
- Existence and adequacy of public interest laws to help victims of environmentally damaging policies and activities; implications of the absence or inadequacy of such laws.
- Development of international laws and legal mechanisms to deal with liability of transnational and international agencies in relation to environmental abuse associated with their policies and practices.

- Managing common property resources; improving management through an understanding of successful approaches in traditional societies and in present-day projects and micro-experiments.
- Traditional laws and norms that protect the environment; challenges and implications of implementing traditional laws for environmental protection.
- Conflicts and complementarities in reconciling traditional and modern environmental laws.

Topic: Conflict Over Natural Resources

Implications of growing resource constraints for local, national, regional, and international violence

- Probabilities of, and regional geopolitical implications of, new or more intense conflicts over resources as environment and resources are degraded and depleted; implications of the intensified use of nonrenewable resources (especially energy).
- Degree to which conflict over resources is an underlying cause for political problems such as ethnic conflicts, nationalist drives, secession movements, and tensions that threaten national unity; possible loci of future conflicts (for example, between and among social classes and groups, local communities, consumers, corporations, the state, foreign governments, and international institutions).
- Implications of the tendency of dominant development models to erode the power of local communities over natural resources and to transfer this power to the state, often acting on behalf of, or together with, commercial interests (forest dwellers losing their land to timber companies; rural villagers relocating to make way for dams).
- Effectiveness of environmental and social impact assessment in relation to the interests of local communities.
- Probable shape of future political institutions and arrangements in response to accelerated resource depletion and other environment problems; implications of increasing chaos and potential "ungovernability."

- Impacts on environment and development of armed conflict, related not only to direct environmental destruction but also to destabilization and social destructuring.

Theme: Knowledge Systems and Technology

Topic: Traditional Knowledge and Technological Systems

Environment/development contributions of traditional knowledge and implications of the erosion of this knowledge base

- Adaptations of communities to their environment; traditional resource management practices; roles of people in local resource management; roles of informal leaders in enhancing local awareness and participation.
- Existing and potential contributions of traditional knowledge to modern economic growth.
- Influence of modernization and technological development on traditional, sustainable patterns of resource use and environmental relationships; natural and social impacts of introducing uniform, unsustainable technological models.
- Means for determining and valuing investments made by the poor in ecological sustainability.
- Development of suitable systems, both global and national, for compensating those who hold valuable traditional knowledge about the characteristics and sustainable uses of their environment and resources.
- Approaches to rescuing and revaluing traditional knowledge about natural resources and their management.

Topic: Modern Science and Technological Systems

Environment/development perils and potentials of modern science and technology

- Technological factors that contribute to environment/development problems: modern technology as the physical instrument facilitating rapid and powerful depletion of resources, greater pollution emissions, increasing concentrations of toxic wastes, displacement of labour, concentration

of power (through corporate and bureaucratic control of powerful technology), etc.

- Environmental problems impacting on technology, including resource depletion and degradation resulting in the reduced utility or life span of technologies.
- Processes and impacts of technology transfer; technology as an instrument of economic interests of TNCs or local big corporations, introduced through investments, loans, aid, or trade; promotion of inappropriate technologies within the North and from North to South.
- Displacement and replacement of environmentally sound local technologies by modern technologies and development projects; sectoral implications (for example, in agriculture, fisheries, industry, transport, health and nutrition, and housing); social and ecological implications (for example, loss of biodiversity, erosion of genetic resources, and increased dependence on imported inputs).
- Impacts of biotechnology on various areas of production; ability of countries to control and generate biotechnologies.
- Relocation of hazardous industries and wastes to the South and the export of banned and hazardous products to the South; regulatory policies of Northern governments that permit or promote such relocations and exports.
- Health hazards and potential hazards associated with nuclear technology, biotechnologies, toxic substances, products, and wastes.
- General social impacts associated with particular types of modern "development" projects (for example, nuclear energy, natural gas, hydroelectric development, and dam construction); postproject studies to address social, cultural, psychological, and economic impacts, and to integrate findings with physical impact assessments and research.
- Possibilities for technological change that respects unique cultural and ecological conditions.
- Mechanisms for increased efficiency in energy use.

Topic: Appropriate Technologies

Development of knowledge and technologies to support sustainable development

- Identification of current environmentally unsound practices in various sectors; requirements for a transition to more environmentally sound practices.
- Assessment of sustainable resource potentials in countries and regions; development and implications of technologies based on the sustainable use of these resources.
- At the national level, means of defining and promoting environmentally appropriate and sound technologies in various sectors, including agriculture, fisheries, forests, water management, energy, and industries; instruments (institutional, financial, informational, etc.) to encourage development of environmental (including restorative) technologies.
- Needs assessment, development, and application of technologies to rehabilitate damaged ecosystems (forests, soil, marine systems, rivers, etc.).
- Technologies for absorbing a growing labour force.
- Role of social and environmental impact assessment in development decision-making; development of such impact assessment and its integration into planning and decision-making.

Theme: Processes of Cultural Change

Topic: Cultural Diversity

Environment/development value of cultural diversity and implications of its loss

- Impacts of development processes on local cultures, ways of life, consumption patterns, recreation activities, etc.; relationships between environmental problems and disruption of local cultures; socioeconomic and cultural transformations resulting from environmental changes at local and regional levels; human adaptations to environmental degradation.
- Disruption and erosion of cultural diversity as a consequence of migration, development processes, and other social changes.

- Environmental implications of the deterioration of cultural wealth; implications of sociocultural change, including social disintegration and marginalization induced by "development," in terms of exacerbating social conditions (such as poverty) that negatively affect the environment.
- Relationships between biological diversity and cultural diversity.
- Cultural perceptions of the environment and resources, including roles and functions; cultural perspectives on the effectiveness of actions to achieve sustainable development.
- Critical assessment of traditional cultures in relation to sustainable resource management.

Topic: Homogenization of Cultures

Mechanisms and environment/development implications of increasing homogeneity in values and aspirations

- Influence of modernization and technological development on culture.
- Changing consumption patterns in the North and the South and their impact on the environment; mechanisms by which consumer patterns are spread, and relationships to communications, cultural paradigms, and technological styles.
- Mechanisms and processes by which traditional cultures survive, resist, and adapt in the face of homogenizing influences.

Topic: Values and Ethical Systems

Relationships between values and behaviours affecting the environment

- Paradigms of human and social development, in particular, the implied environmental viewpoint of aspirations to "modernity"; attitudes, values, and behaviour in relation to the environment.
- Environmental aspects (positive and negative) of religion, ethics, and values; roles of religious institutions and moral teachings in promoting environmental awareness.

- Factors influencing population and consumption levels, including ethical aspects.
- Environmental perceptions of dominant social groups, including industrialists and business people.
- Relationships between environmental changes and changes in human attitudes, formal values, and social structures.
- Changes in norms required for sustainable development; motivations and social springboards for changes in attitude and behaviour.

Topic: Education and Media

Transmission of environmental values, attitudes, and lifestyle or consumer orientations

- Values, attitudes, and perspectives that promote unsustainable economies and lifestyles.
- The role of international media (including print, film, television, popular culture, consumerist culture, and advertising and marketing techniques) in promoting inappropriate lifestyles; impacts on cultural diversity.
- Promotion of existing modes of thinking regarding nature and development through dominant educational and disciplinary paradigms; perpetration of these influences through the educational system, universities, research foundations, etc.
- Implications of approaches to the development of human resources in the Third World, including the influences of education abroad and of international support of research institutions and NGOs.
- Mechanisms for improving awareness and capacity in the media, educational institutions, etc., to promote more environmentally sound values, attitudes, perspectives, and knowledge.

Institutional Development and Research Support

The pace of social, economic, and environmental change compels a more thoughtful and systematized approach to research on development/environment issues, both globally and in the South.

Moreover, the growing value of knowledge worldwide is undeniable — a trend that is likely to become increasingly pronounced. Knowledge will come to play a role similar to that played by capital today. The advantage will lie with those countries capable of acquiring and applying knowledge on critical development/environment issues.

Institutional development and restructuring are therefore of tremendous importance. Knowledge must be obtained and diffused, and mechanisms must be established to apply this knowledge to resolving environment/development problems and to cultivating a sustainable future. The social dimensions of environment/development issues demand particular attention. Social research on these issues must be stimulated, and its relevance enhanced.

Climate and Conditions Needed for Environment/Development Research

International and national support for developing and operating Southern research institutions is highly inadequate, especially for institutions dealing with environment/development research. Significant funds for science, research, and education on environment/development issues should be allocated to universities. Support to independent research institutions is also needed; this could be initiated through seed funds for institution building and support toward eventual self-sufficiency.

To support Southern research institutes, money should be reallocated from currently wasteful expenditures (such as arms or the superfluous consumer products of the North). Without denying the need for a greater international sensitivity to Southern research priorities, there is little moral grounds to blame the North for promoting inappropriate research in the South when governments and organizations in the South are not supporting their own research institutions and when research and education are considered to be issues of secondary importance.

Other constraints that must be addressed include institutional barriers in accessing accurate information; political interference in research focus, research results, and information flow; and inadequate linkages with extension programs. Above all, guaranteed academic freedom and open access to information are essential

— including access for local people and the general public. Multilateral institutions and private-sector corporations must make their information base more accessible. Tools of mass communication must be employed. Broad coalitions to develop and maintain information networks can also provide invaluable information to nonexperts, enabling local people to act as agents rather than objects of change. Such networks also stimulate public support for the free exchange of knowledge and information.

Greater support is also required for the distribution of Southern publications in the North, as is Northern responsiveness to Southern prescriptions for program development relevant to the South. Southern scientists, experts, and institutions should be partners in Northern programs delivered to the South. North–South exchanges are critical because of the global nature of many environmental problems.

In general, major changes must occur in communications between the citizens of the South and between citizens of North and South. Communication between academics, politicians, scientists, and business people must improve. The transnational exchange of ideas, culture, and knowledge are truly the "commodities" that must be opened up to free trade, rather than the materials, energy, pollution, labour, and capital that are now being moved globally.

Principles and Goals to Guide Institutional Development and Actions

Encourage the research community to adopt ecological sustainability as a development objective

The objective of ecological sustainability must be added to the other development objectives acknowledged within the social sciences (namely, basic needs satisfaction, economic growth, a fair distribution of assets and income, and healthy social relations). Researchers must therefore be supported in efforts to come to terms with what "sustainability" means in the context of their work and to incorporate relevant approaches within their research. Social researchers must equip themselves with a knowledge of the different facets of the ecological crisis.

Ensure local anchoring of research and the development of local research capacity

To successfully pursue the research agenda we have proposed, research institutions must have strong local anchoring. Sporadic, short-term visits by experts do not build a firm foundation for understanding local socioeconomic, cultural, and biophysical conditions. In particular, the practice of flying in experts from the North not only downplays local research capacity but also produces disjointed and incomplete knowledge of cumulative processes. The distinctive nature of environmental problems can only be captured by the permanent presence of committed observers. Here, local researchers have a vital role and a comparative advantage. Emphasis on local capacity is justified not only on scientific grounds but also because of the importance of strengthening the participation of local communities. The identification, highlighting, and systematic strengthening of local and regional research capacity is key.

Support the development of indigenous science and technology

Importing technology and expertise from the North fosters financial, social, and scientific dependency. At the same time, inappropriate methods and materials find their way into the Third World. The countries of the South must develop their own science, a science built on the basis of their own needs, both cultural and environmental.

Encourage South–South exchange

A South–South exchange of information and knowledge is essential for improved research capacity in the South. It is also critical because many regions in the South share not only similar development problems but also similar ecosystems and natural resources. Governments and institutions from the South should support South–South training of scientists and South–South exchanges of experience. Partnership programs and interregional research networks among southern institutions for research into common problems must also be financed and promoted.

Support interdisciplinary approaches

Environmental research should be supported by organizing interdisciplinary academic units. These groups would integrate, in an holistic manner, the capacity in the South for solving environmental problems. Educational training should include lectures, seminars, and courses designed to foster interest in, and an understanding of, environmental problems among social scientists.

Environmental research and study centres must include social science practitioners from a wide range of disciplines, including economics, law, sociology, and anthropology. Support for the participation of women and indigenous cultures must also be part of the costing of environment/development research.

Encourage interinstitutional, interregional, and intersectoral cooperation and consultation

Mechanisms are needed for national and regional consultations among social researchers and practitioners working in various settings, such as universities, other research institutes, governments, and NGOs. Working cooperatively to collect and manage information on socioenvironmental problems, social researchers and practitioners can play a key role in planning and decision-making. But, to do this, they require access to relevant and accurate information.

Create linkages between research and application

It is also important to ensure the dissemination, practical testing, and application of research results. Policies should be developed through an interactive process of scientific analysis, program development, and field results. This requires a high level of cooperation between research institutes, researchers working in other settings, and those involved in delivering development and social programs.

Promote public participation and exchange

We are often told that we live in a global world. However, we seem to be learning less and less about the lives of people in other countries and in other regions of the same country. This cultural isolation can be and has been used to manipulate workers

and consumers. Institutions must therefore devise creative ways of passing their research results onto a broader public, perhaps through creative uses of popular media and methods. Of utmost importance are the linkages between Southern and Northern workers, farmers, and artists of all kinds for mutual education and communication. Through such linkages, and not through proclamations and declarations from "above," people will recognize their common concerns and interests in relation to development and the environment.

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Members of the Commission

Anil Agarwal

Since 1980, Dr Anil Agarwal has been the Director of the Centre for Science and Environment in New Delhi, India. From 1977 to 1980, he worked with the International Institute for Environment and Development in London and, from 1984 to 1986, he was the chairperson of Environmental Liaison Centre International in Nairobi, Kenya. Recognized worldwide as an authority on environment/development issues, Dr Agarwal has received several national and international awards, including the Padma Shri from the Government of India, the Global 500 Award from the United Nations Environment Programme, the A.H. Boerma Award from the Food and Agriculture Organization of the United Nations, and the Vikram Sarabhai Memorial Award from the Indian Council of Social Science Research. Dr Agarwal has written, coauthored, and edited numerous books on environment- and technology-related issues.

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Born in Mexico, Julia Carabias is currently with the Ecology Laboratory, Faculty of Sciences, Universidad Nacional Autónoma de México (UNAM). She holds membership in, and is affiliatied with, the Botanical Society of Mexico, the National System of Research (Mexico), Consejo Universitario UNAM, the Consejo Consultivo Programa Nacional de Solidaridad, and the Comité Editorial Routa Agrociencias. Ms Carabias is also the Program Coordinator for the Programa de Aprovechamiento Integral de Recursos Naturales, UNAM, and has authored, coauthored, and edited several articles and books on issues of the environment and natural resource management in Mexico and Central America.

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Erna Witoelar

Erna Witoelar is currently a Member of the Board of the Indonesian Consumers Organization in Jakarta, Director and Chief Editor of its monthly consumer's magazine, *Warta Konsumen*, and President of the International Organization of Consumers Unions. She founded the Indonesian Environmental Forum (WALMI), a network of environmental NGOs, and has served as its Chairman and as a Member of its Board. In addition to holding several positions with various international organizations, Mrs Witoelar was member of the Advisory Committee on Industry and Sustainable Development for the Bruntland Commission and a Member of the Board for Environmental Liaison Centre International in Nairobi, Kenya.

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For Earth's Sake is the product of the Commission on Developing Countries and Global Change, pictured above: *from left to right, sitting:* Anil Agarwal (India), Alvaro Soto (Colombia), Erna Witoelar (Indonesia), and Julia Carabias (Mexico); *standing:* Adolfo Mascarenhas (Tanzania), Thandika Mkandawire (Senegal), and Martin Khor Kok Peng (Malaysia).

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