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CANADA'S ENVIRONMENT

A FRAMEWORK FOR ACTION

A REPORT PREPARED BY
THE FEDERAL-PROVINCIAL
TASK FORCE ON A
CANADIAN ACTION PLAN

CANADA'S ENVIRONMENT:

A FRAMEWORK FOR ACTION

A Report Prepared by
the Federal-Provincial
Task Force on a Canadian
Action Plan Respecting
the Environment.

June 17, 1975

Environment Canada | Environnement Canada
Planning and Finance Service

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Ottawa, Ontario
K1A 0H3

Mr. J.B. Seaborn
Chairman
Intergovernmental Committee of Deputy
Ministers for Environmental Affairs
Ottawa, Ontario
K1A 0H3

Your file *Votre référence*

Our file *Notre référence*

Dear Mr. Seaborn:

At the Federal-Provincial Meeting of Deputy Ministers for Environmental Affairs held in October, 1972, it was agreed that an action plan should be developed jointly by the federal and provincial governments as a Canadian response to the Stockholm Conference on the Human Environment.

A federal-provincial task force was subsequently established and prepared the attached report: "Canada's Environment: A Framework for Action".

The task force has prepared eighty recommendations for both unilateral and bilateral action to address concerns expressed during the Stockholm Conference which are considered pertinent to Canada's environmental/resource situation. As well, concerns voiced at the 1973 Man and Resources Conference were reviewed in preparation of the task force's report.

Because of Canada's geographical and resource diversity the task force members preferred not to establish a unified set of national action priorities but, rather, have emphasized the need for joint national consideration of a number of the recommendations which have major environmental/resource significance of national scope.

I have the honour to submit, on behalf of the members of the Federal-Provincial Task Force on a Canadian Action Plan, this report for consideration by members of the Intergovernmental Committee of Deputy Ministers for Environmental Affairs.

Yours respectfully

André A. Grignon, Chairman
Federal-Provincial Task Force
on a Canadian Action Plan

INDEX

ABSTRACT

In response to the 1972 United Nations Conference on the Human Environment a review was made from a Canadian perspective of the 26 principles and 109 recommendations adopted at the conference. From this review, together with consideration for other Canadian environmental issues, necessary areas of action to preserve and improve the human environment have been identified. The environmental concerns and recommendations for action have not been priorized and do not necessarily represent present commitments of the provincial and federal governments. Instead, they are intended to provide a basis for both unilateral and multilateral action. The latter can best be approached through federal-provincial accords at the national level and by international agreements at the international level. The report also makes several recommendations for immediate action by both levels of government on such areas of concern as, for example, land use, population, energy and resource conservation.

FOREWORD

The 1972 United Nations Conference on the Human Environment made it clear that a broad approach to the problems of the environment was required. Because environmental problems are complex and do not respect legislative boundaries, this necessitates responsible action by all individuals, groups and governments. In order to provide impetus for cooperative action, this report has been prepared by a Task Force established by an Intergovernmental Committee of Deputy Ministers having environmental or renewable resource management responsibilities. The Task Force's membership included representatives from the federal government and each of the provincial governments.

While this report does not catalogue present environmental policies, programs and activities, it should be noted that much has been or soon will be done by all levels of government in Canada to help resolve many of our environmental problems. As well, this report does not set priorities for action. On a number of issues, agreement by all governments in Canada on national priorities may emerge. However, Canada's geographical and resource diversity, together with the sharing of responsibilities for resource and environmental management under the British North America Act, make the setting of priorities the responsibility of individual governments, or a matter of intergovernmental consultation where multijurisdictional issues are involved.

For convenience of reference the report is presented in three major sections: a summary of the Task Force recommendations advanced in each chapter; the body of the report proper; and an appendix listing the 109 recommendations made at the Stockholm Conference.

It is hoped that this report will encourage each province to prepare similar, but more detailed, reports about their Human Environment and the necessary courses of action required to protect and enhance it.

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REPORT RECOMMENDATIONS

RECOMMENDATIONS FOR CANADIAN ACTION

CHAPTER II

FOR THE MAINTENANCE OF A VIABLE RESOURCE BASE IT IS RECOMMENDED THAT GOVERNMENTS:

RESOURCE DEVELOPMENT

1. *strengthen policies relating to the management of natural resources to maximize the productive capability of the resource base. In this context governments should adopt environmental strategies for the development of resources. Such strategies would include the setting of resource management guidelines and requirements based on knowledge acquired as to the sensitivities and productive capabilities of specific resources.*

LAND USE POLICY

2. *develop coordinated policies which recognize the economic, social and environmental implications of land use. Such policies should provide the basis for programs relating to:*

   - maintenance of the land as a primary base for the production of renewable resources;

   - preservation and rehabilitation of arable land for food production;

   - management and development of coastal zones;

   - legislative protection of unique and significant ecological areas and historic and cultural sites;

   - adequate distribution of population providing for fulfillment of human needs in terms of housing, settlement pattern, recreation, and industrial development.

MARINE RESOURCES MANAGEMENT

3. *undertake comprehensive studies of available natural off-shore marine resources relating to the regulation of the harvest of the living resources and the extraction of the non-renewable resources of off-shore areas.*

RESOURCE MANAGEMENT PROGRAMS

4. *adopt management programs that will:*

-employ a multi-disciplinary approach;

-identify specific resource management objectives;

-include the free exchange of information and expertise among governments.

RESOURCE CONSERVATION

5. *take steps to curtail the wasteful use of natural resources by:*

-offering financial incentives to encourage the adoption of waste recycling processes;

-requiring adequate treatment of all waste based on the 'polluter pays' principle;

-using the pricing mechanism to encourage conservation in natural resource use; for example with respect to water consumption, waste production, energy use, etc.;

-instituting or expanding programs devoted to solid waste management;

-revising present product quality standards which embody "throw away" concepts or which lead to rapid obsolescence planned to require frequent "new model introduction";

-promoting packaging methods which involve the least waste and assessing the true costs of so-called "convenience" practices in terms of resource conservation and environmental quality considerations;

-showing leadership in the prudent and conservative use of resources.

ENERGY CONSERVATION

6. *develop a national policy that will promote the conservation of energy by considering:*

-implementation of a major national program related to the development of alternative energy sources and the establishment of a national power grid;

-increasing the efficiency of existing energy production and distribution systems including the need for upgrading building standards to minimize energy drain caused by inadequate insulation requirements or inefficient heating facilities;

-revising rates to discourage increased energy use;

-development of alternatives to present transportation systems and road use;

-utilizing the waste heat from power generating stations.

SITE REHABILITATION

7. require the developer to implement reclamation or rehabilitation measures that will ensure the site affected by its operations is restored to the conditions necessary for the continued production of renewable resources;

MAN AND THE BIOSPHERE PROGRAM

8. continue to participate in the UNESCO Program on Man and the Biosphere (MAB) and utilize, where possible, the results of its findings;

PROTECTION OF GENETIC RESOURCES

9. cooperate and participate in national and international programs designed to identify, protect and sustain genetic resources threatened with extinction;

NATIONAL AMBIENT QUALITY OBJECTIVES

10. develop and adopt national ambient quality objectives for air and water and coordinate monitoring programs to collect data needed for the maintenance and protection of the environment;

HEALTH HAZARD REDUCTION

11. cooperate in using municipal, provincial and federal expertise to develop international standards that will minimize exposure to conditions which are hazardous to human health;

MONITORING CONTAMINANTS AND POLLUTANTS	12.	*develop and/or strengthen programs related to the monitoring of contaminants and pollutants to provide information for the:* *-assessment of compliance with and enforcement of appropriate regulations;* *-development of new legislation or the revision of existing legislation to minimize or eliminate their effects on man and the environment;* *-refinement or development of facilities and processes for their effective control.*
ENHANCEMENT OF THE MARINE ENVIRONMENT	13.	*continue giving high priority to preventing degradation of the marine environment by:* *-accelerating programs of water quality management in river basins and at shoreline facilities;* *-undertaking coordinated studies of the pollution of the marine environment;* *-expanding programs of research on the impact of river-borne and air-borne pollutants on the oceans.*
ENVIRONMENTAL BASELINE STUDIES	14.	*carry out environmental baseline studies and examine the present status of environmental monitoring programs. Needs should be identified and measures recommended so that a firm basis may be established for pollution control and resource conservation, for development planning, and for the assessment of environmental impact of development projects.*
ENVIRONMENTAL IMPACT ASSESSMENT	15.	*develop specific legislation to ensure that all undertakings likely to have a significant effect on the environment are subject to continued monitoring and assessment so that:* *-appropriate and timely contingency action may be taken;* *-future development planning and product design may incorporate new information resulting from the monitoring process.*

ENVIRONMENTAL ASSESSMENT GUIDELINES	*16.*	*prepare appropriate guidelines for environmental assessments which will consider the bio-physical, social and economic implications of development projects, including:* *-product design, development and use;* *-technical innovations and product changes;* *-development plans and policies;* *-government legislation.*

CHAPTER III

WITH RESPECT TO ECONOMIC CONSIDERATIONS IT IS RECOMMENDED THAT GOVERNMENTS:

COSTING BENEFITS	1.	*develop ways of costing the intangible as well as the tangible benefits of resources (wildlife, for example) so that cost benefit analysis may serve as a more realistic guide in selecting management and use options.*
ECONOMIC WORTH OF ENVIRONMENTAL PROTECTION	2.	*develop improved methods of evaluating the economic worth of environmental protection as an aid to decision-making in resource and economic development so as to reconcile economic objectives with maintenance of desired levels of environmental quality.*
NATIONAL GROWTH INDICES	3.	*develop a measure of national growth that will reflect not only the economic, but also the social and environmental benefits and costs of development.*
ENVIRONMENTAL ACCOUNTABILITY	4.	*apply the concept of environmental accountability to industries and undertakings whose activities are likely to create a risk of serious and widespread damage to the environment.*
THREATS TO TRADE	5.	*cooperate in international efforts to identify threats to trade arising from environmental policies and develop common standards to minimize such threats.*

AVOIDANCE OF DISCRIMINATORY POLICIES

6. *examine the impact of environmental policies and programs on the present and future potential of all parts of Canada and seek to reach national consensus on the avoidance of discriminatory policies. Examine the international and interprovincial trade implications of environmental policies. Canada should also support and participate in those international endeavours which are best suited to:*

-undertake the monitoring of world trade trends as these may be affected by the exchange of environmental protection technologies;

-provide forums for the resolution of conflicts in this area.

CANADA'S NORTHERN DEVELOPMENT

7. *emphasize programs that will encourage the economic development appropriate to Canada's northern areas. Such programs must be designed so as to:*

-recognize the rights and respect the culture of native peoples;

-fulfill the needs of northern residents;

-protect the fragile northern ecosystems.

ENVIRONMENTAL TOLERANCES

8. *assess the environmental tolerances within their jurisdictions to provide a basis for:*

-establishing limits to further development in areas where critical pollution thresholds have been reached;

-developing industrial location strategies that take into account the assimilative capacity of areas considered for new or expanded development;

-minimizing environmental risks and costs in areas considered for economic development assistance.

FINANCING ENVIRONMENTAL CLEAN-UP	*9.*	*finance environmental clean-up where the burden may be beyond the means of industries or communities with environmentally obsolete facilities.*
CONSTRAINTS ON FINANCING LOCAL ENVIRONMENTAL MANAGEMENT PROGRAMS	*10.*	*determine the extent to which environmental management at the local level is constrained by the emphasis on property values as the major base for municipal revenues. Alternatives to existing methods of financing should be sought which would encourage greater recognition of environmental and social values in assessment practices.*
LAND SPECULATION	*11.*	*control speculation in land acquisition and ownership. Consideration may be given to:* *-taking into account potential (as opposed to actual) land use for tax assessment purposes;* *-increasing taxes levied against speculative gains;* *-undertaking land assembly programs so as to provide an alternative to privately owned land supply sources.*
OBSOLETE FACILITIES	*12.*	*develop adjustment programs to facilitate the phasing out of environmentally unacceptable facilities. Such programs may consider:* *-the relocation of industrial activities;* *-the retraining and relocation of associated manpower;* *-the protection of the dependent communities.*
ASSISTANCE TO LESS DEVELOPED AREAS	*13.*	*provide technical and financial assistance required by less developed areas of Canada so that environmental management responsibilities can be met; support similar international assistance to less developed countries.*

DEVELOPMENT INCENTIVE	*14.*	*incorporate provisions for the protection of the environment in incentive programs extending financial or other assistance to designated economically depressed or underdeveloped areas of Canada;*
DISCLOSURE OF ENVIRONMENTAL IMPLICATIONS	*15.*	*encourage businesses, whose activities are likely to have a significant effect on the environment, to include in prospectuses and annual reports the environmental implications of their operations.*

CHAPTER IV

FOR THE IMPROVED EFFECTIVENESS OF PLANNING, IT IS RECOMMENDED THAT GOVERNMENTS:

NATIONAL OBJECTIVES

1. *cooperate in developing comprehensive national environmental, social and economic objectives and specify how progress towards their attainment will be measured.*

DEVELOPMENT OBJECTIVES

2. *set desirable environmental, social and economic objectives for resource development by both the private and public sectors, and specify how progress towards their attainment will be measured.*

LAND USE TOLERANCES

3. *study land use tolerances to ensure that urban and industrial development planning is not out of harmony with nature; that residential clusters provide a healthy environment that avoids adverse side effects of high density living, and that real costs, social, environmental and economic, be taken into account in the planning process.*

REDIRECTION OF GROWTH

4. *study the value of redirecting growth pressures on major urban areas. Consideration may be given to:*

   - *a critical review of zoning criteria and taxing at the provincial and municipal levels to ensure that social and ecological factors are given adequate weight in developing legislation and building codes;*
   - *use of economic and social incentives to assist, where necessary, in the most desirable location of industry and population.*

ZONING

5. *examine policies and regulations relating to land use zoning to ensure that consideration be given to environmental, social and economic factors in preferred land use both within and adjacent to the zoned areas. Zoning regulations should encourage biological productive uses of the natural environment and recognize the need for:*

-segregation of conflicting uses;

-retention of opportunities for alternate use;

-retention and protection of arable lands for agricultural production;

-prohibition of settlement or development in areas of natural hazard (flood plains, unstable soil or slope conditions, etc.).

SPILL-OVER	*6.*	*identify those development projects likely to have a potential for spill-over of adverse environmental effects into other jurisdictions and take prompt action to notify those jurisdictions. Interjurisdictional consultation among environmental departments should take place early in the planning process.*
PUBLIC PARTICIPATION	*7.*	*develop guidelines for the processes by which public comment may be sought.*
PLANNING PROCESS	*8.*	*remove fragmentation and duplication of responsibility for planning functions within the federal, provincial and municipal levels.*
ENVIRONMENTAL ASSESSMENT	*9.*	*require that environmental assessment be included as an integral part of project planning.*

CHAPTER V

IN MATTERS RELATING TO INFORMATION, EDUCATION AND RESEARCH IT IS RECOMMENDED THAT GOVERNMENTS:

INFORMATION GATHERING

1. *develop and/or expand programs for the collection, measurement, analysis, use and exchange of data and information necessary to maintain environmental quality.*

INTERNATIONAL REFERRAL SERVICE

2. *support Canada's participation in the International Referral Service program.*

EXCHANGE OF ENVIRONMENTAL TECHNOLOGIES

3. *institute reporting systems that will encourage the exchange of environmental technologies.*

RESOURCE INVENTORIES

4. *enlarge programs designed to increase data on the natural resource base, to facilitate the exchange of such data and to encourage its consideration in comprehensive development planning. Programs should not be restricted to measurement of present supply but should contribute to the improved conservation and management of natural resources by considering:*

-needs in terms of social, economic and environmental objectives;

-replacement rates and optimum sustained yield levels of renewable resources;

-depletion rates of non-renewable resources;

-the effects of increased resource use levels and of resource conserving policies (e.g., recycling, substitute materials, alternative energy sources) on present levels of supply.

ENVIRONMENTAL STATUS REPORT

5. *implement programs to inform Canadians about:*

-current environmental concerns and measures taken to solve them;

-the finite nature of non-renewable resources and the need for their conservation;

-the management and utilization of resources under their respective jurisdictions.

PRODUCT IMPACT STATEMENTS	6.	*require businesses to provide more factual information on the effects on man and his environment of the use, or mis-use, of their products. In this respect, products of possible harm should be so labelled and, in the case of chemicals, information as to their toxic effect on man and his environment must be made available to all segments of society.*
MONITORING	7.	*establish and/or expand monitoring programs so as to:* *-forecast natural disasters and thereby reduce their impact;* *-provide information for assessing the impact of technological development and minimizing, or eliminating, its adverse effects;* *-increase the effectiveness of contingency planning by expanding the information base.*
RESOURCE USE	8.	*develop or expand programs to inform the public on the management and utilization of resources under their respective jurisdictions and cooperate with the public media in their coverage of environmental topics of current and future concern.*
ASSISTANCE TO PUBLIC INTEREST GROUPS	9.	*provide financial aid in support of information-gathering by public interest groups endeavouring to promote conservation of resources and protection of the environment.*
ENVIRONMENTAL EDUCATION	10.	*promote environmental understanding in the elementary, secondary and post-secondary levels of education by:* *-incorporating at the elementary and secondary levels, environmental themes in appropriate courses in the school program;*

-encouraging a multi-disciplinary approach in the design of post-secondary courses of study;

-ensuring that teachers are provided with the necessary background to enable them to promote an understanding of environmental concerns.

ADULT EDUCATION

11. encourage community organizations, associations and professional societies to institute programs to increase environmental understanding.

ENVIRONMENTAL RIGHTS

12. develop programs to make citizens more aware of environmental legislation and their environmental rights.

CONSUMER EDUCATION

13. expand education programs that stress the role of consumers in influencing product design and development.

TRAINING ASSISTANCE TO DEVELOPING COUNTRIES

14. support federal and provincial programs of training assistance to developing countries. Such programs should be planned and carried out in the receiving country so that local conditions may be recognized in formulation and application. Such assistance should be consistent with Canada's environmental policies, but should not threaten or endanger the cultural heritage of the receiving country.

COORDINATION OF RESEARCH

15. encourage close coordination of research by:

-organizing periodic federal-provincial conferences to review progress and identify needs;

-determining priorities in research funding and its relation to other governmental and industrial programs and priorities;

-establishing or improving mechanisms that promote the effective exchange of ideas and research among industrial, academic and government sectors;

-increasing the involvement in research programming of legislative, management and development groups by whom the results will be applied.

NATIONAL INFORMATION CENTRES

16. *cooperate in setting up a national information centre to inventory research in resource and environmental fields so that present information can be more widely utilized, knowledge gaps identified and duplication avoided.*

RESEARCH NEEDS

17. *prepare comprehensive and coordinated plans for research centres and areas. Lands for these purposes should be reserved early to avert encroachments which may impair their usefulness.*

POLLUTANTS

18. *increase research on the effects of pollutants on man and his environment so as to provide the scientific basis for setting environmental quality objectives, developing pollution control guidelines, and promulgating and enforcing regulations to control sources of pollution.*

GENETIC DIVERSITY

19. *expand research to increase knowledge of the genetic diversity of flora and fauna and the composition and ecology of soil organisms and cooperate in the preparation of a national inventory of genetic resources as a basis for:*

-improving programs for the presentation of endangered species;

-facilitating the application of genetic skills to crop breeding programs;

-developing and improving programs for increasing harvests from renewable resources;

-enhancing the capability for the maintenance of ecological diversity.

SOIL PRODUCTIVITY	20.	*expand research directed to the maintenance of soil productivity so as to increase the knowledge of the:* *-physical properties of soils;* *-stability of various land forms;* *-role of micro-organisms in the ecology of soils;* *-effects of pesticides, herbicides and artificial fertilizers on the soil regime.*
PRODUCT SUBSTITUTES	21.	*expand research into the development of substitutes for products or goods having a detrimental effect on the environment and enact or, where necessary, amend legislation curbing the use of such deleterious products or goods.*
DISSEMINATION OF RESEARCH RESULTS	22.	*encourage research agencies to promote the preparation of review articles, monographs, etc., so as to ensure its wider dissemination to the non-specialist.*
DEVELOPMENT OF ENVIRONMENTAL TECHNOLOGY	23.	*initiate programs to encourage development of new environmental technology, particularly in the fields of pollution prevention and control, through selected measures such as:* *-subsidization of patent searches and registration;* *-grants to partially offset development costs;* *-incentives to encourage export and internation use of Canadian technology.*

CHAPTER VI

IN FULFILLMENT OF ENVIRONMENTAL RESPONSIBILITIES IT IS RECOMMENDED THAT:

DEVELOPMENT OF ENVIRONMENTAL ACTION PLANS	1.	*all governments cooperate in establishing priorities for implementing the recommendations of this report according to the agreed-upon schedules and in this respect, develop and implement plans for action within their jurisdiction appropriate to the Principles and Recommendations of the Stockholm Conference.*
CANADIAN PARTICIPATION IN U.N. ACTIVITIES	2.	*provincial governments support and, where appropriate, cooperate with the federal government wherever Canadian participation is called for in actions initiated by the Secretary-General of the United Nations or its agencies pursuant to the recommendations of the Stockholm Conference.*
PERIODIC ASSESSMENT OF THE STATE OF THE ENVIRONMENT	3.	*all governments undertake periodic assessments of the state of the environment in order to identify emerging problems and facilitate their early resolution, and to anticipate necessary adjustments to policies, legislation and programs.*
GOVERNMENT STRUCTURES	4.	*all governments examine the multiple-level structure of government in Canada with a view to improving its responsiveness in meeting the needs of all people within the context of the constitution.*
INTERGOVERNMENTAL COOPERATION	5.	*governments cooperate in the joint development of programs, plans and strategies for the maintenance and enhancement of environmental quality and support the federal government in international activities in this regard.*

ENVIRONMENTAL RESPONSIBILITIES IN AREAS OUTSIDE NATIONAL BOUNDARIES	6.	*governments continue to support international programs and agreements designed to prevent over-utilization of resources in areas where jurisdictional responsibility has not been defined. In this respect Canada should continue to show leadership in pressing for international agreement on the delegation of responsibility for the protection and management of ocean and other resources lying outside national boundaries.*
MIGRATORY SPECIES	7.	*the federal government initiate and strengthen international agreements relating to the protection and harvesting of migratory fish and wildlife.*
INTERNATIONAL CONVENTIONS/AGREEMENTS	8.	*the federal government consult with provincial governments in developing its participation in activities leading to international conventions or agreements on environmental matters involving provincial jurisdiction or of mixed jurisdiction.*

CHAPTER VII

FOR THE IMPROVEMENT OF THE QUALITY OF LIFE OF THE INDIVIDUAL
IT IS RECOMMENDED THAT GOVERNMENTS:

SOCIAL ACCOUNTABILITY	1.	*cooperate in developing a model of social accountability which would account for the costs and benefits of the total impact of environmental change upon all aspects of our society including not only the economic, but the social and psychological effects as well.*
NATIONAL POPULATION POLICY	2.	*develop a national population policy by undertaking studies related to population growth rates and distribution, and per capita resource consumption.*
ASSISTANCE TO INDIVIDUALS	3.	*provide assistance to persons seeking damages in the courts for injuries to their health or property by contaminants or pollutants.*
THE WORK ENVIRONMENT	4.	*monitor health risks attendant upon the use of or exposure to toxic substances in the work environment.*
HAZARDOUS MATERIALS	5.	*minimize the risk of environmental damage in the manufacture, transportation, handling and storage of environmentally hazardous materials.*
EFFICIENT USE OF SERVICE FACILITIES	6.	*reduce pressures on public service facilities through flexible working hours, adjustments of shift schedules, and the decentralization of working sites.*
RECREATIONAL FACILITIES	7.	*improve the accessibility of public recreational facilities. Public recreational areas should be designed to provide opportunity for multiple activities to fill the needs of all income groups.*
DIVERSITY OF CULTURE AND LIFE-STYLE	8.	*foster the diversity of culture and life-styles of Canada's peoples.*
ACCESS TO BASIC NEEDS	9.	*ensure that access to health care, employment and an adequate home and leisure environment are available to all citizens regardless of their location, economic situation or position in the social structure.*

Chapter I

INTRODUCTION

"Man is both creator and moulder of his environment". These were the opening words of the Declaration of the United Nations Conference on the Human Environment. Science and technology have given him a greater capacity to mould his environment than that possessed by any other species. Environmental problems, in the industrialized countries at least, are primarily related to the industrial applications of technology. Advancing knowledge and technology also lie behind the phenomenal modern expansion of world population. This expansion, in turn, is making man more dependent than ever upon the help of science and technology in exploiting natural resources.

Therein lies our major dilemma. In the past, population expansion has been met by the expansion, through technology, of man's resource base. Yet much more than technology is needed if the long-term productivity of our natural resource base is to be safeguarded. Man must increase his understanding of the environment and use his increasing knowledge to collaborate with nature. He must expand his economic thinking and adjust his scale of values to take the environmental facts of life fully into account. Preservation and enhancement of the environment must be linked with the goals and objectives of all his planning.

Responsibility for the environment must be accepted and shared at every level - the individual and the community, institutions, enterprises, organizations and governments, local, national and international. The Stockholm Conference called upon governments and peoples "to exert common efforts for the preservation and improvement of the human environment, for the benefit of all the people and for their posterity."

The protection of individual national environments is dependent, in part, upon protection of the world environment. It was the growing realization of this fact that set the stage for acceptance of the proposal for an international conference on the human environment made by Sweden in early 1968 to the United Nations Economic and Social Council.

Sweden's proposal was co-sponsored by Canada and approved by the United Nations General Assembly on December 3, 1968. Canada then became an active member of the 27-nation Preparatory Committee formed to plan the Conference. It was held in Stockholm, June 5-16, 1972. Its objectives were:

1. *To provide a framework for comprehensive consideration within the United Nations of the problems of the human environment in order to focus the attention of government and public opinion on the importance and urgency of this question, (General Assembly Resolution 2398 (xxiii) of December 3, 1968) and*

2. To serve as a practical means to encourage and to provide guidelines for action by governments and international organizations. (General Assembly Resolution 2581 (xxiv) of December 15, 1969).

In an attempt to meet these objectives, representatives of the nations at the Conference considered and approved:

-a Declaration on the Human Environment which set forth 26 principles of international behaviour and responsibility;

-an Action Plan for the Human Environment containing a framework for environmental action and 109 recommendations for action at the international level;

-new institutional arrangements within the United Nations designed to help implement the Action Plan.

The fundamental consensus of the Conference was expressed in Principle 1 of the Declaration, which states, in part, that:

"Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations".

The remaining principles flow out of Principle 1 and form the basis for the following chapters of this report.

The resolutions agreed upon at the Stockholm Conference in accordance with these principles confer a responsibility upon participating nations to undertake measures which will protect and enhance the human environment. The responsibility will be the greatest for those nations, such as Canada, which played a prominent role in the conference, if the credibility of their efforts is to be maintained.

In response to this challenge a Federal-Provincial Task Force was established to set out an approach to environmental action by:

1. providing a basis for federal-provincial cooperation and response to the national and international recommendations flowing from Stockholm and the regional consultations which preceded the Conference;

2. identifying major environmental issues and outlining roles and areas for cooperative action by the federal and provincial governments in Canada;

3. providing a basis for the development of individual environmental action plans by the federal and provincial governments.

The Task Force in preparing this report considered, in addition to the resolutions agreed to at Stockholm, other environmental and resource issues which are of particular concern to Canadians. These include issues raised at the regional consultations held in eleven centres across Canada from April 5 to May 5, 1972, as well as concerns expressed at the Man and Resources Conference sponsored by the Canadian Council of Resource and Environment Ministers in Toronto in November, 1973.

The word "environment" is taken in this report to include both the natural and man-made environment. Thus the areas of discussion will include the cultural and social as well as the biological and physical environments.

While the chapters which follow are based on the general areas treated in the Principles of the Stockholm Conference, there will be certain themes which run through them all. Quality of life, for example, is the dominant theme of all the Principles. Quality of life cannot be maintained, let alone improved, on a global scale without a viable resource base; without careful attention to economic and social considerations; without sound planning, and without effective information exchange, education and research.

Chapter II

MAINTENANCE OF THE RESOURCE BASE

The U.N. Declaration on the Human Environment and its associated Action Plan emphasize that resource development and use can no longer be based on economic considerations alone. The world's natural resource base is now seen as neither infinitely flexible nor capable of renewal without limit. The key management objective must therefore be to maintain those conditions necessary to ensure that the biosphere continues to be a balanced, self-perpetuating yet evolving natural system to which man must adjust his demands and activities.

Six of the 26 principles adopted at Stockholm express specific concern for the protection of the world's resource base. These are:

Principle 2

The natural resources of the earth including the air, water, land, flora and fauna and especially representative samples of natural ecosystems must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Principle 3

The capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved.

Principle 4

Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat which are now gravely imperilled by a combination of adverse factors. Nature conservation, including wildlife, must therefore receive importance in planning for economic development.

Principle 5

The non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment are shared by all mankind.

Principle 6

The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. The just struggle of the peoples of all countries against pollution should be supported.

Principle 7

States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

In harmony with these principles, the environmental and renewable resource job that needs to be done in Canada is

-to manage the renewable resources to get greater harvests while maintaining basic productivity and diversity;

-to guide man's activities so that the natural environment may become and remain healthy, attractive and bountiful;

-to improve the utilization of the non-renewable resources to get the greatest value in terms of short and long range needs of mankind.

Environmental management has tremendous social, economic and political implications. Man's demands upon the environment go far beyond his basic needs of food and fibre. For example, not only does he want better fish harvests, he demands also sparkling waters and attractive coves.

The basic requirements for survival and enjoyment of the environment by present and future generations cannot be ignored. As well, the rising aspirations of mankind must be borne in mind in setting environmental quality objectives. Public desires in this respect must receive consideration not only by governments in Canada, but within the world community of developed and developing nations.

The ecological dimensions of man's activities cannot be isolated from the socio-economic dimensions. There is concern in some quarters that a too rapid implementation of environmental protection and resource conservation principles could lead to socio-economic disaster. Consequently, there is a need to strike a balance between resource development and environmental quality.

There are particular problems associated with common property resources. Many of the principal resources belong to society generally. While the fish are in the waters, or the wildlife in the forests, it has been assumed that they belong to no single individual or nation. Basic elements of the environment like air, water and certain lands are common property.

Private individuals or enterprises long assumed that this common property aspect of air and water conferred a right to discharge wastes into them. It is for governments to prevent individuals and enterprises from saving costs by unfairly passing on their problems to others through the misuse of common property.

Jurisdictional responsibilities have not always been clearly assigned in cases of common property resources. In addition, the pattern of Canadian development over the years has seen many of our resources, including the land base itself, pass to the private sector. Individual stewardship of resources sometimes leads to neglect of the common interest.

Implementation of the Stockholm principles, so far as they relate to resource management, can only be achieved to the degree that a country takes an active role in the control of its resources, or to the degree that it is given management responsibility within the community of nations for resources lying outside national boundaries. Canada's concern for these international responsibilities has been demonstrated by her participation in the United Nations Conference on the Law of the Sea.

Implications for Canada of the U.N. Recommendations

The need is obvious for an intensified search for new approaches to environmental problems at all levels of society. Among other things, there must be adjustments in values and standards of living that involve heavy demands and wasteful utilization of resources. Action is called for in four broad areas: conservation, pollution control, environmental impact assessment and information exchange.

Conservation

It is the duty of governments to safeguard both environmental quality and productivity, and to see that resources are managed to the benefit of all. Canada, along with many other countries, has taken legislative steps to carry out these responsibilities. In many cases, however, it will be necessary for governments to seek a more active role in the management and use of the land and its resources to avoid economic, social or environmental disparity.

The role of land as a primary base for the production of renewable resources, and the support of man's many activities, must be closely examined.

Land use has a direct effect on environmental quality. Poor land use leads to environmental degradation. Governments should cooperate in developing policies that will set priorities for land use so as to facilitate sound environmental management throughout Canada. A meaningful national land use policy will relate to population, energy, environmental values and urban and industrial development; but it should also emphasize that the primary concern is the protection of productive capacity.

Canada must continue to press, in international forums, for acceptance of her proposals relating to the responsibility for management of marine resources lying outside national boundaries. In the management, protection and use of offshore resources within her jurisdiction, Canada must also take fully into account the growing body of knowledge concerning the marine environment.

Conservation implies not only the application of management and husbanding practises to initial resource production, but also the adoption of measures to curtail their wasteful use. The North American way of life contributes to the wasteful use of resources. The single-person use of automobiles, the magnitude of expenditure on pet care, and the non-agricultural use of fertilizers are examples. Studies will be required to assess the extent to which resource use processes and practices result in waste, and to develop methods by which waste levels can be reduced. Policies and programs to bring about a "conservation-oriented" approach by resource users in all sectors of society are also needed. Consideration may be given to the use of financial penalties and incentives, assistance for innovative research and public education measures.

Canada is comparably well situated with regard to energy resources but their management requires close cooperation between the federal and provincial governments to ensure that all Canadians enjoy their benefit. Not only is energy a major component of economic development, but its production has major environmental consequences for both the immediate and long term. The finite nature of fossil and nuclear fuels, the loss of

alternative uses of lands inundated for power reservoirs, the disposal of radio-active wastes and the impact on the environment of the production, distribution and use of energy, must all be taken into account in determining its ultimate cost to the consumer.

There is not only a need for the conservation of energy and continuing research into alternate sources, but also for the development of a national policy on the management of energy resources for domestic and international use.

Resource conservation must also consider all of the future productive potentialities of areas subject to resource development activities. A notable example is the site destruction resulting from strip mining. The harvesting of renewable resources can also cause serious site deterioration. Surface reclamation, or rehabilitation measures are therefore necessary components of resource management or development plans.

The recommendations of Stockholm also call for international participation in programs designed to promote research into all man/environment problems, including resources. Concern is expressed for the protection of genetic resources and the identification and establishment of areas of ecological interest. Effective participation by Canada will require the cooperation and support of all governments.

Pollution Control

Environmental quality is a relative term - so is pollution. Problems occur where pollution exceeds a defined level of tolerance in terms of environmental quality or where resources are rendered incapable of supporting a desired quality of life. Criteria must therefore be developed to establish tolerance levels and monitoring programs which will ensure that these levels are not exceeded. National ambient quality objectives for air and water must be developed and adopted to ensure a continuing high quality for Canadians, to provide a basis for effective monitoring, and to facilitate the development and implementation of pollution control regulations. Close cooperation among all levels of government will be required. Canada's participation in the development of international standards can benefit from provincial and municipal expertise in pollution control.

Environmental Impact

The potential effects of human activities on the environment must be assessed. Not only must their local and immediate effects be subjected to analysis, but their distant and long-term effects must be assessed and

monitored continuously. Environmental assessment must be carried out in the planning stages, parallel in consideration with all other feasibility studies such as economic and engineering. Assessment must also continue through to the completion of the planned development and be kept under active review in the operating period.

The results of the assessment must then be used in evaluating the dimensions of the problem in determining the feasibility of the project, in decision making and in design modification. Money spent in order to protect the environment is an investment in improved environmental design.

Information Exchange

"Information Exchange" involves the collection, analysis, storage and exchange of information as well as its dissemination through training and education. Governments should try to achieve a greater standardization of the processes involved in these respects. In relation to the resource base, it includes inventory, survey, registry and monitoring. Use may be made of networks, remote surveillance and sensing facilities, information banks and referral systems to identify problems and assist in determining the steps necessary to their solution.

Knowledge required for the attainment of resource and development goals calls for expansion in research, information exchange, training and education by government, industry and the academic sector.

These activities provide tangible gains, e.g., improved flood plain management, more efficient resource management and development planning, reduction of pollution levels, and longer range and greater accuracy in weather forecasting to aid transportation, agriculture, energy supply and industry generally.

Recommendations for Canadian Action

For the maintenance of a viable resource base, it is recommended that governments:

1. *strengthen policies relating to the management of natural resources to maximize the productive capability of the resource base. In this context governments should adopt environmental strategies for the development of resources. Such strategies would include the setting of resource management guidelines and requirements based on knowledge acquired as to the sensitivities and productive capabilities of specific resources.*

2. *develop coordinated policies which recognize the economic, social and environmental implications of land use. Such policies should provide the basis for programs relating to*

   -maintenance of the land as a primary base for the production of renewable resources;

   -preservation and rehabilitation of arable land for food production;

   -management and development of coastal zones;

   -legislative protection of unique and significant ecological areas and historic and cultural sites;

   -adequate distribution of population providing for fulfillment of human needs in terms of housing, settlement patterns, recreation, and industrial development;

3. *undertake comprehensive studies of available natural off-shore marine resources relating to the regulation of the harvest of the living resources and the extraction of the non-renewable resources of off-shore areas;*

4. *adopt management programs that will:*

   -employ a multi-disciplinary approach;

   -identify specific resource management objectives;

   -include the free exchange of information and expertise among governments;

5. *take steps to curtail the wasteful use of natural resources by:*

   -offering financial incentives to encourage the adoption of waste recycling processes;

   -requiring adequate treatment of all waste based on the 'polluter pays' principle;

   -using the pricing mechanism to encourage conservation in natural resource use; for example with respect to water consumption, waste production, energy use, etc.;

-instituting or expanding programs devoted to solid waste management;

-revising present product quality standards which embody "throw away" concepts or which lead to rapid obsolescence planned to require frequent "new model introduction";

-promoting packaging methods which involve the least waste and assessing the true costs of so-called "convenience" practices in terms of resource conservation and environmental quality considerations;

-showing leadership in the prudent and conservative use of resources.

6. *develop a national policy that will promote the conservation of energy by considering:*

-implementation of a major national program related to the development of alternative energy sources and the establishment of a national power grid;

-increasing the efficiency of existing energy production and distribution systems including the need for upgrading building standards to minimize energy drain caused by inadequate insulation requirements or inefficient heating facilities;

-revising rates to discourage increased energy use;

-development of alternatives to present transportation systems and road use;

-utilizing the waste heat from power generating stations;

7. *require the developer to implement reclamation or rehabilitation measures that will ensure the site affected by its operations is restored to the conditions necessary for the continued production of renewable resources;*

8. *continue to participate in the UNESCO Program on Man and the Biosphere (MAB) and utilize, where possible, the results of its findings;*

9. *cooperate and participate in national and international programs designed to identify, protect and sustain genetic resources threatened with extinction;*

10. *develop and adopt national ambient quality objectives for air and water and coordinate monitoring programs to collect data needed for the maintenance and protection of the environment;*

11. *cooperate in using municipal, provincial and federal expertise to develop international standards that will minimize exposure to conditions which are hazardous to human health;*

12. *develop and/or strengthen programs related to the monitoring of contaminants and pollutants to provide information for the*

    -assessment of compliance with and enforcement of appropriate regulations;

    -development of new legislation or the revision of existing legislation to minimize or eliminate their effects on man and the environment;

    -refinement or development of facilities and processes for their effective control;

13. *continue giving high priority to preventing degradation of the marine environment by:*

    -accelerating programs of water quality management in river basins and at shoreline facilities;

    -undertaking coordinated studies of the pollution of the marine environment;

    -expanding programs of research on the impact of river-borne and air-borne pollutants on the oceans;

14. *carry out environmental baseline studies and examine the present status of environmental monitoring programs. Needs should be identified and measures recommended so that a firm basis may be established for pollution control and resource conservation, for development planning, and for the assessment of environmental impact of development projects;*

15. *develop specific legislation to ensure that all undertakings likely to have a significant effect on the environment are subject to continued monitoring and assessment so that:*

    -appropriate and timely contingency action may be taken;

    -future development planning and product design may incorporate new information resulting from the monitoring process;

16. *prepare appropriate guidelines for environmental assessments which will consider the bio-physical, social and economic implications of development projects, including:*

    -product design, development and use;

    -technical innovations and product changes;

    -development plans and policies;

    -government legislation.

Chapter III

ECONOMIC CONSIDERATIONS

Pollution is costly. The nations of the world were slow in awakening to that fact. But pollution control is also costly. Who pays? How? When environmental protection becomes a cost item in the manufacture of goods, how does this affect trade and commerce at home and abroad? What happens when industries or governments cannot afford to absorb the costs of environmental measures?

Such questions received considerable attention at Stockholm. In particular, it was emphasized that environmental policies of states should not work to the present or future economic disadvantage of developing countries. Economic stability is required by all if they are to take ecological considerations adequately into account. Programs of environmental management must be paid for, and on the international scene this will call for international technical and financial assistance being made available. The relevant principles are:

Principle 10

For the developing countries, stability of prices and adequate earnings for primary commodities and raw material are essential to environmental management since economic factors as well as ecological processes must be taken into account.

Principle 11

The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries, nor should they hamper the attainment of better living conditions for all, and appropriate steps should be taken by States and international organizations with a view to reaching agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures.

Principle 12

Resources should be made available to preserve and improve the environment, taking into account the circumstances and particular requirements of developing countries and any costs which may emanate from their incorporating environmental safeguards into their development planning and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose.

From the Canadian perspective these principles are particularly significant. It has already been pointed out that Canadian regional disparities are somewhat analogous to disparities between developed and developing countries in other parts of the world. Points to be considered in applying the principles to Canada are:

1. The provinces and regions of Canada are economically interdependent and economic instability in one part of the country has implications for other parts. This economic interdependence has importance when consideration is given to the fiscal dependence of environmental management on the economic system of the country.

2. Environmental policies and programs have an impact on the present and future potential of all parts of Canada and some uniformity is desired in order to avoid discriminatory policies.

3. In view of the regional economic disparities within Canada, governments must provide the technical and financial assistance required by less developed areas so that they can adequately carry out their environmental management responsibilities.

Canada is also one of the great trading nations and must be particularly aware of the economic implications of environmental policies as they may affect international trade. At the international level, therefore, Canadian governments should:

1. recognize that the stability of the highly interdependent international trading community is a critical factor in carrying out environmental management functions and that Canada must actively participate in the formulation and implementation of policies to ensure international economic stability;

2. carefully examine their environmental policies in terms of their impact on the present or future development potential of developing countries with a view to avoiding adverse economic effects upon these countries; and

3. provide both financial and technical assistance to the developing countries in carrying out their environmental management functions while simultaneously maintaining adequate support for Canadian environmental management programs.

Implications for Canada of the U.N. Recommendations

Canadian Development Planning

Canada has a mixed market economy with both public and private ownership of resources. Development planning must therefore involve the

public and private sectors. Areas of potential conflict between economic development and the maintenance of environmental quality must be identified and a balance struck.

Legislation now exists requiring the private sector to consider certain aspects of the environment in its planning. For example, effluent and emission controls must meet standards set by clean water and air statutes. The incorporation of environmental considerations into business planning and government regulations is not easy. It is difficult to set a price on the worth of intangible environmental values. The environmental problems associated with each economic sector must be separately identified. Assessment of the environmental impact of industrial developments is necessary to ensure the systematic study of these problems. Their solution depends upon the identification and analysis of the environmental, socio-economic relationships of alternative development approaches.

Governments and industry must seek to develop methods of assessing presently intangible benefits and costs in relation to resource development and the economic worth of environmental protection measures. Also needed is some measure of national growth which will reflect the social and environmental, as well as the economic benefits and costs associated with Canadian development. Appropriate environmental quality standards may then be set and environmental problems associated with industries may be more readily identified.

The regulatory approach to the incorporation of environmental values into business planning should be reinforced by applying the concept of environmental accountability to industries and undertakings whose activities may threaten the environment. In other words, the "polluter must pay" principle should be applied with some assurance that the polluter can pay.

Adverse Trade Implications of Canadian Environmental Policies

Canada must identify major threats to exports of developing countries that arise from Canadian environmental concerns and policies. She must also inform her trading partners in advance about the more stringent Canadian environmental policies. The crucial nature of interprovincial trade within the country makes it necessary that similar information be available at the domestic level on the environmental concerns and policies of levels of government within Canada. Where appropriate, Canada should participate in international undertakings designed to reconcile conflict between environmental and trade objectives.

Positive Economic Implications for Canada

Variations in the resources and the ecosystems of different parts of Canada may have some significant economic implications for the less industrialized areas of the country. Canada has tended to concentrate industrial capacity in the major metropolitan areas. This situation has led to deterioration in environmental quality in areas of high population, while other parts of Canada remain relatively undeveloped and pollution-free. This is especially the case in the northern regions whose economic potential is now beginning to be realized.

Canada has many alternative locations available for industrial development. As a country in a period of growing industrialization, there exists an opportunity to include environmental quality as a significant factor in policies concerning the distribution of the various types of industrial development. Therefore, existing environmental quality in underdeveloped areas can be used as a factor to attract types of development which do not detract from or degrade that quality.

Financing Canadian Environmental Action

The costs of financing environmental action in Canada are borne by both the public and private sectors and ultimately by the Canadian taxpayer. Some segments of both the private and public sectors cannot "afford" the costs of environmental action, for example, the municipality with a poor tax base or a depressed industry. This raises questions about the allocation of scarce fiscal and technical resources. Closing down "dirty" industries results in dislocation problems. Municipal governments may be faced with the problem of allocating resources among such things as police protection, sewage treatment, etc.

There are also financial problems related to the clean-up of resources which have been allowed to deteriorate. It may be that remedial actions cannot be carried out by the responsible party, through inability to meet the costs or even identify them.

Assistance programs should be designed to recognize the costs necessary to fulfill environmental management responsibilities so as to preclude the possibility that such programs will contribute to environmental deterioration.

Exchange of Canadian Environmental Technologies

Canada must meet and resolve a wide variety of bio-physical environmental problems. This, combined with the country's high level of

technological capability, means that Canada is able to make significant contributions to the international pool of environmental protection technologies. Canada must also ensure that the technologies she develops are passed on to the developing countries.

The exchange of technologies is not without obtacles. Traditional attitudes inhibit the rapid spread of new knowledge and innovative procedures. Patents, "trade secrets" and intergovernmental competition enter into the picture. Patent protection and "trade secrets" are part of Canada's economic system. Innovation and invention must be fostered globally, and incentives provided where appropriate. Protection of ownership rights may contribute to this end, but financial assistance for innovative research and development may also be necessary.

Recommendations for Canadian Action

It is recommended that governments:

1. *develop ways of costing the intangible as well as the tangible benefits of resources (wildlife, for example) so that cost benefit analysis may serve as a more realistic guide in selecting management and use options;*

2. *develop improved methods of evaluating the economic worth of environmental protection as an aid to decision-making in resource and economic development so as to reconcile economic objectives with maintenance of desired levels of environmental quality;*

3. *develop a measure of national growth that will reflect not only the economic, but also the social and environmental benefits and costs of development;*

4. *apply the concept of environmental accountability to industries and undertakings whose activities are likely to create a risk of serious and widespread damage to the environment.*

5. *cooperate in international efforts to identify threats to trade arising from environmental policies and develop common standards to minimize such threats;*

6. *examine the impact of environmental policies and programs on the present and future potential of all parts of Canada and seek to reach national consensus on the avoidance of discriminatory policies. Examine the international and interprovincial trade implications of environmental policies. Canada should also support and participate in those international endeavours which are best suited to:*

   -undertake the monitoring of world trade trends as these may be affected by the exchange of environmental protection technologies;

   -provide forums for the resolution of conflicts in this area;

7. *emphasize programs that will encourage the economic development appropriate to Canada's northern areas. Such programs must be designed so as to:*

   -recognize the rights and respect the culture of native peoples;

   -fulfill the needs of northern residents;

   -protect the fragile northern ecosystems;

8. *assess the environmental tolerances within their jurisdictions to provide a basis for:*

   -establishing limits to further development in areas where critical pollution thresholds have been reached;

   -developing industrial location strategies that take into account the assimilative capacity of areas considered for new or expanded development;

   -minimizing environmental risks and costs in areas considered for economic development assistance;

9. *finance environmental clean-up where the burden may be beyond the means of industries or communities with environmentally obsolete facilities;*

10. *determine the extent to which environmental management at the local level is constrained by the emphasis on property values as the major base for municipal revenues. Alternatives to existing methods of financing should be sought which would encourage greater recognition of environmental and social values in assessment practices;*

11. *control speculation in land acquisition and ownership. Consideration may be given to:*

    -taking into account potential (as opposed to actual) land use for tax assessment purposes,

    -increasing taxes levied against speculative gains,

    -undertaking land assembly programs so as to provide an alternative to privately owned land supply sources;

12. *develop adjustment programs to facilitate the phasing out of environmentally unacceptable facilities. Such programs may consider:*

    -the relocation of industrial activities,

    -the retraining and relocation of associated manpower,

    -the protection of the dependent communities;

13. *provide technical and financial assistance required by less developed areas of Canada so that environmental management responsibilities can be met; support similar international assistance to less developed countries;*

14. *incorporate provisions for the protection of the environment in incentive programs extending financial or other assistance to designated economically depressed or underdeveloped areas of Canada;*

15. *encourage businesses whose activities are likely to have a significant effect on the environment, to include in prospectuses and annual reports the environmental implications of their operations.*

Chapter IV

PLANNING

While planning was implicit in the majority of the principles of the Stockholm Declaration, the six listed below made explicit references to the need for planning in the development of natural resources and human settlements in order to minimize adverse effects.

Principle 13

In order to achieve a more rational management of resources and thus to improve the environment, states should adopt an integrated and coordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve the human environment for the benefit of their population.

Principle 14

Rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment.

Principle 15

Planning must be applied to human settlement and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits for all. In this respect projects which are designed for colonialist and racist domination must be abandoned.

Principle 16

Demographic policies, which are without prejudice to basic human rights and which are deemed appropriate by governments concerned, should be applied in those regions where the rate of population growth or excessive population concentrations are likely to have adverse effects on the environment or development, or where low population density may prevent improvement of the human environment and impede development.

Principle 17

Appropriate national institutions must be entrusted with the task of planning, managing or controlling the environmental resources of states with the view to enhancing environmental quality.

Principle 18

Science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems and for the common good of mankind.

These principles draw attention to a number of specific needs which must be addressed in Canada, in particular:

- The planned use of resources to ensure compatibility between development and the demands imposed by environmental protection and enhancement;

- The application of planning to human settlements to meet pressures of increasing population and urbanization and to maximize social, economic, and environmental benefits;

- The development of appropriate institutions to assume responsibility for the planning task;

- The application of science and technology to the identification of environmental risks and the avoidance of environmental problems.

Implications for Canada of the U.N. Recommendations

Planning implies the existence of specific objectives. In the case of resource development, the objective in the past has largely been confined to a return on investment. Settlements, until recent years, tended to grow to meet immediate needs and long-range planning was seldom a consideration in settlement development.

Today it is realized that objectives must be spelled out for settlement and resource development activities at many levels, in harmony with comprehensive national objectives which give appropriate attention to social and environmental, as well as economic needs. Projects and program statements should include descriptions of how it is proposed to attain these objectives.

A greater recognition of human and environmental values in construction and development design and settlement layout is called for to ensure that the environmental quality necessary to man's safety, health and well-being is maintained and protected.

Concern was expressed at the Stockholm Conference over the increasing pressures resulting from demographic trends, both in terms of population numbers as well as population distribution. The latter is of particular significance to Canada because of the concentration of her people and industry within relatively few growth centers. Today, attention is being given to social and ecological as well as economic factors as determinants of the quality of the environment of urban settlements. Growth pressures, whether resulting from population size, distribution, or consumption per capita, must be examined.

Serious thought must be given to the retention of arable lands for agricultural production. Encroachment on the agricultural land base by industrial development and urban sprawl can no longer be ignored. Canada must consider not only her own needs, but also her role as a food supplier to the international community. Regulations should discourage "irreversible" decisions which might destroy a high agricultural potential. Obvious examples are the use of such lands for highways, housing or industrial developments which effectively rule out the return of the land to its primary state.

The degree to which land use zoning can be used to segregate conflicting uses and to prevent degradation of the urban environment will depend on the relative weights given to social, economic and environmental factors. Activities within one zone may also adversely affect adjacent areas. Appropriate inter-jurisdictional cooperation and consultation may be needed to resolve such problems.

Consultation among governments is a prerequisite to planning wherever a potential exists for transboundary environmental effects of projects and programs. The planning process may thus involve decision-making at many levels and stages of program and project development. The selection among alternatives requires that relevant information be available and that analytical techniques be developed that can help identify problem areas.

Public involvement in the earliest stages will greatly facilitate planning. The public hearings process is one method of achieving such involvement. Another method is the publication of progress reports of on-going assessments.

Timing can be of crucial importance in the planning process from the point of view of psychological stresses which may result from the speed with which one change is superimposed on another. This "Rate of Change" stress should be taken into account in all planning decisions.

Identification of Issues for Canadian Action

It is recommended that governments:

1. *cooperate in developing comprehensive national environmental, social and economic objectives and specify how progress towards their attainment will be measured;*

2. *set desirable environmental, social and economic objectives for resource development by both the private and public sectors, and specify how progress towards their attainment will be measured;*

3. *study land use tolerances to ensure that urban and industrial development planning is not out of harmony with nature; that residential clusters provide a healthy environment that avoids adverse side effects of high density living, and that real costs, social, environmental and economic, be taken into account in the planning process;*

4. *study the value of redirecting growth pressures on major urban areas. Consideration may be given to:*

   -a critical review of zoning criteria and taxing at the provincial and municipal levels to ensure that social and ecological factors are given adequate weight in developing legislation and building codes,

   -use of economic and social incentives to assist, where necessary, in the most desirable location of industry and population;

5. *examine policies and regulations relating to land use zoning to ensure that consideration be given to environmental, social and economic factors in preferred land use both within and adjacent to the zoned areas. Zoning regulations should encourage biological productive uses of the natural environment and recognize the need for:*

   -segregation of conflicting uses

   -retention of opportunities for alternate use

   -retention and protection of arable lands for agricultural production

   -prohibition of settlement or development in areas of natural hazard (flood plains, unstable soil or slope conditions, etc.);

6. *identify those development projects likely to have a potential for spill-over of adverse environmental effects into other jurisdictions and take prompt action to notify those jurisdictions. Interjurisdictional consultation among environmental departments should take place early in the planning process;*

7. *develop guidelines for the processes by which public comment may be sought;*

8. *remove fragmentation and duplication of responsibility for planning functions within the federal, provincial and municipal levels;*

9. *require that environmental assessment be included as an integral part of project planning.*

Chapter V

INFORMATION, EDUCATION, RESEARCH

Two of the Stockholm principles emphasized the necessity of increasing public understanding of environmental problems, with special attention to educational programs for the young, and the need to promote environmental scientific research together with the international exchange of scientific information and expertise. The principles are:

Principle 19

Education in environmental matters, for the younger generation as well as adults, giving due consideration to the under-privileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment but, on the contrary, disseminate information of an educational nature, on the need to protect and improve the environment in order to enable man to develop in every respect.

Principle 20

Scientific research and development in the context of environmental problems, both national and multinational, must be promoted in all countries, especially the developing countries. In this connection, the free flow of up-to-date scientific information and transfer of experience must be supported and assisted to facilitate the solution of environmental problems; environmental technologies should be made available to developing countries on terms which would encourage their wide dissemination without constituting an economic burden on the developing countries.

The importance of information exchange, education and research, both nationally and internationally, is recognized by all governments in Canada.

It is therefore necessary that Canada emphasizes programs which not only provide the data base for environmental protection and enhancement, but also increase public understanding and assist Canadians generally to make environmentally sound decisions.

Implications for Canada of the U.N. Recommendations

Information

Canada has special expertise to share with other countries in fields like fisheries, water resource management, hydro-electric development and sustained yield forestry. Within the nation, the establishment of a national information centre could consolidate existing information and data in the resource and environmental fields. Such a centre would assist in the coordination of research programs among governments and between the private and public sector. It would allow knowledge gaps to be identified, and duplication of effort to be avoided.

An expansion of information gathering programs is implied in the majority of the Stockholm recommendations, especially those relating to the maintenance of the resource base. Programs are needed which relate supply to present and future demand, both national and international. Social, economic and environmental objectives should also be related to replacement rates of renewable resources and the depletion rates of non-renewable resources.

A lack of sufficient environmental awareness until about a decade ago caused an unbalanced emphasis on economic considerations in business and public decision-making. It has become apparent that environmental and social costs of a "profitable" project or program may result in a net dis-economy.

An informed public is a major force influencing development through consumer demand. When the public understands environmental implications of the production and disposal of various goods, it can do much to reduce or avert adverse impacts of products, new and old. Government-instituted information programs can do much to help public understanding of the implications of using environmentally questionable products. In addition, more factual information on the effects on man and his environment of the use or mis-use of products should be required on labels.

While governments can act directly in a number of ways to expand public environmental understanding through specific programs and legislation, they should also explore other avenues. They should, for example, cooperate more effectively with the media in their coverage of environmental topics. Financial support might be given to information programs mounted by public interest groups endeavouring to promote conservation of resources and protection of the environment.

Increased attention will be called for in the area of human health and safety. There is a need to develop or expand monitoring systems to provide early warning of natural disasters so that effective contingency plans may be implemented. More preventative measures and information will be needed on the deleterious effects of various emissions into the environment.

Education

The Stockholm Recommendations reflected a strong international desire to upgrade and diversify educational programs so that the public may be able to influence the quality of their own environment through a better understanding of the issues at stake. It was felt that environmental studies should be included in school curricula at all levels.

In countries like Canada, this will call for an expansion of natural and human science programs through the introduction of a broader spectrum of environmental subjects and/or the incorporation of environmental themes in all courses of the elementary and secondary levels. Education at the post-secondary, technological or professional levels should ensure that the same emphasis is given to the social and environmental aspects of applied science and technology as is given to the economic and physical.

Adult education programs should receive more attention and should include the area of environmental 'rights' and legislation as well as the role of the consumer in influencing product development. Business and social groups should be encouraged to take part in or support such programs.

In the developing countries there is a special need for environmental education. As the essential means for improving the standard of living are introduced, so also are opportunities for the misunderstanding and abuse of the products of technology. Assistance to developing countries must be linked with education programs to ensure the proper application of introduced technologies. Local conditions must be fully taken into account in training assistance programs for developing countries. Such programs should be planned and carried out within the receiving country rather than in the country of origin.

Research

Recommendations made at the Conference point up the need for increased research in all subject areas. This applies to basic research, as well as to applied research undertaken to improve technology and to develop new processes. All such research should include continuous assessment of the impact of its results on the environment. Alternatives for products or programs judged to have a detrimental environmental effect should be sought.

Governments and industry should coordinate their research efforts so that they may be mutually supporting and avoid duplication. The establishment of a national information centre, suggested above, could assist in the identification of research priorities. Periodic federal-provincial conferences on future environmental research needs will promote orderly planning and progress towards identified objectives and establish a sound basis for policy and budgetting. Close liaison should be maintained with all groups

by whom the results will be applied, so as to ensure that real needs are met.

The increasing encroachment of urban and industrial development on areas suitable for research sites and study areas makes it advisable that such lands be identified and reserved from alienation as soon as these needs are known.

Research on the effects of pollutants on man and his environment needs to be expanded to provide a sound basis for guidelines and objectives in pollution control as well as for legislation, enforcement and monitoring measures. A major effort is called for in preserving and safeguarding genetic resources and soil productivity if Canada is to continue to be a food producer for the international community. Where factors of demand or supply dictate the development of product substitutes, information on their impact on man and his environment must be provided.

Some of the results obtained through research should be re-published in a form that can be readily understood by the layman. This will do much to increase public acceptance of necessary restrictive legislation on environmental protection and enhancement and to increase consumer resistance to products and practices of questionable environmental value.

Recommendations for Canadian Action

It is recommended that governments:

1. *develop and/or expand programs for the collection, measurement, analysis, use and exchange of data and information necessary to maintain environmental quality;*

2. *support Canada's participation in the International Referral Service program;*

3. *institute reporting systems that will encourage the exchange of environmental technologies;*

4. *enlarge programs designed to increase data on the natural resource base, to facilitate the exchange of such data and to encourage its consideration in comprehensive development planning. Programs should not be restricted to measurement of present supply but should contribute to the improved conservation and management of natural resources by considering:*

   -needs in terms of social, economic and environmental objectives,

   -replacement rates and optimum sustained yield levels of renewable resources

-depletion rates of non-renewable resources

-the effect of increased resource use levels and of resource conserving policies (e.g., recycling, substitute materials, alternative energy sources) on present levels of supply;

5. *implement programs to inform Canadians about*

-current environmental concerns and measures taken to solve them,

-the finite nature of non-renewable resources and the need for their conservation,

-the management and utilization of resources under their respective jurisdictions;

6. *require businesses to provide more factual information on the effects on man and his environment of the use, or mis-use, of their products. In this respect, products of possible harm should be so labelled and, in the case of chemicals, information as to their toxic effect on man and his environment must be made available to all segments of society.*

7. *establish and/or expand monitoring programs so as to:*

-forecast natural disasters and thereby reduce their impact,

-provide information for assessing the impact of technological development and minimizing, or eliminating, its adverse effects,

-increase the effectiveness of contingency planning by expanding the information base;

8. *develop or expand programs to inform the public on the management and utilization of resources under their respective jurisdictions and cooperate with the public media in their coverage of environmental topics of current and future concern;*

9. *provide financial aid in support of information-gathering by public interest groups endeavouring to promote conservation of resources and protection of the environment;*

10. *promote environmental understanding in the elementary, secondary and post-secondary levels of education by:*

-incorporating at the elementary and secondary levels, environmental themes in appropriate courses in the school program,

-encouraging a multi-disciplinary approach in the design of post-secondary courses of study,

-ensuring that teachers are provided with the necessary background to enable them to promote an understanding of environmental concerns;

11. *encourage community organizations, associations and professional societies to institute programs to increase environmental understanding;*

12. *develop programs to make citizens more aware of environmental legislation and their environmental rights;*

13. *expand education programs that stress the role of consumers in influencing product design and development;*

14. *support federal and provincial programs of training assistance to developing countries. Such programs should be planned and carried out in the receiving country so that local conditions may be recognized in formulation and application. Such assistance should be consistent with Canada's environmental policies, but should not threaten or endanger the cultural heritage of the receiving country;*

15. *encourage close coordination of research by*

-organizing periodic federal-provincial conferences to review progress and identify needs,

-determining priorities in research funding and its relation to other governmental and industrial programs and priorities,

-establishing or improving mechanisms that promote the effective exchange of ideas and research among industrial, academic and government sectors,

-increasing the involvement in research programming of legislative, management and development groups by whom the results will be applied;

16. *cooperate in setting up a national information centre to inventory research in resource and environmental fields so that present information can be more widely utilized, knowledge gaps identified and duplication avoided;*

17. *prepare comprehensive and coordinated plans for research centres and areas. Lands for these purposes should be reserved early to avert encroachments which may impair their usefulness;*

18. *increase research on the effects of pollutants on man and his environment so as to provide the scientific basis for setting environmental quality objectives, developing pollution control guidelines, and promulgating and enforcing regulations to control sources of pollution;*

19. *expand research to increase knowledge of the genetic diversity of flora and fauna and the composition and ecology of soil organisms and cooperate in the preparation of a national inventory of genetic resources as a basis for:*

    -improving programs for the preservation of endangered species,

    -facilitating the application of genetic skills to crop breeding programs,

    -developing and improving programs for increasing harvests from renewable resources,

    -enhancing the capability for the maintenance of ecological diversity;

20. *expand research directed to the maintenance of soil productivity so as to increase the knowledge of the:*

    -physical properties of soils,

    -stability of various land forms,

    -role of micro-organisms in the ecology of soils,

    -effects of pesticides, herbicides and artificial fertilizers on the soil regime;

21. *expand research into the development of substitutes for products or goods having a detrimental effect on the environment and enact or, where necessary, amend legislation curbing the use of such deleterious products or goods;*

22. *encourage research agencies to promote the preparation of review articles, monographs, etc., so as to ensure its wider dissemination to the non-specialist;*

23. *initiate programs to encourage development of new environmental technology, particularly in the fields of pollution prevention and control, through selected measures such as:*

    -subsidization of patent searches and registration,

    -grants to partially offset development costs,

    -incentives to encourage export and international use of Canadian technology.

Chapter VI

THE RESPONSIBILITIES OF GOVERNMENT

Six of the Stockholm principles dealt with environmental responsibilities of states within the global community.

In brief, while sovereign rights of states to exploit their own resources must be recognized, all governments have a responsibility for safeguarding other states, particularly neighboring ones, from the adverse environmental effects of resource exploitation. That responsibility should be recognized through international law regarding liability and compensation for such adverse effects. Secondly, international cooperation and coordination in environmental protection and improvement is a necessity. Recognition must be given to varying systems of values and the varying ability of states to apply standards agreed upon by the international community. Thirdly, man and his environment must be spared the effects of nuclear weapons and all other means of mass destruction. The relevant principles are:

Principle 21

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.

Principle 22

States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such states to areas beyond their jurisdiction.

Principle 23

Without prejudice to such criteria as may be agreed upon by the international community, or to standards which will have to be determined nationally, it will be essential in all cases to consider the systems of values prevailing in each country, and the extent of the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for the developing countries.

Principle 24

International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big or small, on an equal footing. Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all states.

Principle 25

States shall ensure that international organizations play a coordinated, efficient and dynamic role for the protection and improvement of the environment.

Principle 26

Man and his environment must be spared the effects of nuclear weapons and all other means of mass destruction. States must strive to reach prompt agreement, in the relevant international organs, on the elimination and complete destruction of such weapons.

In essence, these principles apply within a federal system like that in Canada as well as internationally. Although problems of the human environment are worldwide and interdependent, solutions can be most effectively approached on a local level -- regional or national. Individual responsibilities must be recognized where powers are shared between the federal and provincial governments.

In Canada, both the federal and provincial governments have responsibilities with respect to environmental quality and pollution control and abatement. While environmental management is not specifically mentioned in the B.N.A. Act, governments have nevertheless dealt with various aspects of environmental management through specific powers assigned to them under the constitution. For example, the provinces have authority over property and civil rights, local works and undertakings, agriculture, and ownership of natural resources within provincial boundaries. This puts responsibility on provincial governments to act in the area of environmental management. Federal authority, on the other hand, stems from its responsibility for criminal law, peace, order, and good government, as well as from specific responsibilities under the B.N.A. Act for such things as shipping and navigation, marine and inland fisheries, extra-provincial undertakings, territories, and international relations.

Environmental management requires the employment of both planning and regulatory strategies. On the one hand, programs of regional planning and development concerning land use, zoning, housing, local transport, water supply and sewage treatment are considered basic provincial responsibilities which can be most effectively planned and applied at the provincial and local levels. Federal activities and responsibilities which have a direct impact on these matters should complement, and be supportive of provincial plans. On the other hand, the international promotion of Canada's environmental objectives and responsibilities as well as the defense of the Canadian environment from international and interprovincial environmental hazards require the action of the Federal Government.

The recognition that all levels of government in Canada have important responsibilities to manage the environment has fostered the development of a variety of intergovernmental mechanisms to ensure the development and implementation of sound environmental programs. There is a need for thoughtful study and coordination of the roles and functions of various levels of government in environmental matters to permit governments to carry out their responsibilities and to ensure that individual and collective goals are most effectively achieved.

Though the constraints imposed by our constitution are sometimes felt to be inconvenient, they often help to ensure that problems are dealt with at a level of government that is appropriate.

Implications for Canada of the U.N. Recommendations

While some of the Stockholm recommendations were directed to the United Nations and its agencies and all had some degree of international implication, a number dealt directly with the responsibilities of states in their relationships within the world community. These may be broadly considered under three headings: International programs; Conferences and Conventions; and Consultation and Cooperation.

a) International Programs

Establishment and/or support of international improvement programs is recommended in a broad spectrum of environmental areas. While coordination, for the most part, is to be by various United Nations agencies, support was solicited from individual governments in implementing measures to improve the quality of life, to encourage the conservation and management of resources, and to increase understanding of environmental relationships.

b) Conferences and Conventions

The need was recognized for instruments to achieve global environmental goals. Recommendations were made calling upon nations to accept responsibility for developing and signing conventions and treaties for the protection and improvement of the world environment. Of special importance is the need to recognize responsibility for internationally shared resources and to ensure that benefits accruing from their exploitation are equitably shared.

c) Consultation and Cooperation

Programs, conferences and conventions can only result when nations assume responsibility for consulting on mutual problems and goals, and for cooperating in achieving their solution. Such consultation applies, not only to shared resource management, but also to the effect of a nation's development on areas beyond its jurisdiction. In other words, national responsibility spills over to 'global' responsibility. The environment is not divided up according to man-made boundaries.

Adherence to the principles will thus require an increased awareness of the need for cooperation and consultation on environmental and resource development matters among members of the international community. In addition to maintaining membership and active participation in U.N. bodies, consultation between states, particularly those having common "regional" problems, will require strengthening to ensure that the environmental aspects of policies and activities having international dimensions receive the attention they deserve.

Recommendations for Canadian Action

It is recommended that:

1. *all governments cooperate in establishing priorities for implementing the recommendations of this report according to agreed-upon schedules and in this respect, develop and implement plans for action within their jurisdiction appropriate to the Principles and Recommendations of the Stockholm Conference;*

2. *provincial governments support and, where appropriate, cooperate with the federal government wherever Canadian participation is called for in actions initiated by the Secretary-General of the United Nations or its agencies pursuant to the recommendations of the Stockholm Conference;*

3. *all governments undertake periodic assessments of the state of the environment in order to identify emerging problems and facilitate their early resolution, and to anticipate necessary adjustments to policies, legislation and programs;*

4. *all governments examine the multiple-level structure of government in Canada with a view to improving its responsiveness in meeting the needs of all people within the context of the constitution;*

5. *governments cooperate in the joint development of programs, plans and strategies for the maintenance and enhancement of environmental quality and support the federal government in international activities in this regard;*

6. *governments continue to support international programs and agreements designed to prevent over-utilization of resources in areas where jurisdictional responsibility has not been defined. In this respect Canada should continue to show leadership in pressing for international agreement on the delegation of responsibility for the protection and management of ocean and other resources lying outside national boundaries;*

7. *the federal government initiate and strengthen international agreements relating to the protection and harvesting of migratory fish and wildlife;*

8. *the federal government consult with provincial governments in developing its participation in activities leading to international conventions or agreements on environmental matters involving provincial jurisdiction or of mixed jurisdiction.*

CHAPTER VII

QUALITY OF LIFE

The question of quality of life is implicit in all the Stockholm Principles. Principle One asserts man's right to "freedom, equality and adequate conditions of life", and specifies that this right must be exercised in an environment which permits a life of dignity and well-being. The remaining principles provide the guidelines for developing environmental action in harmony with this first principle. Two of the remaining principles raise more specific quality of life issues. They are:

Principle 8

Economic and social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life.

Principle 9

Environmental deficiencies generated by the conditions of underdevelopment and natural disasters pose grave problems and can best be remedied by accelerated development through the transfer of substantial quantities of financial and technological assistance as a supplement to the domestic effort of the developing countries and such timely assistance as may be required.

The goal indicated in these principles is to assure the environmental and economic conditions that will enable all men to pursue freely their individual aspirations. These conditions do not at present exist for everyone. There are significant variations in the quality of life not only between one country and another, but also within the same country. Nor is this situation peculiar to developing countries, it applies equally to countries like Canada.

An urgent concern in Canada is the development of social indicators which can give some measure of quality of life. Many federal and provincial agencies are concerned with this problem. A generally acceptable measure is elusive because 'quality of life' is highly subjective. It varies from individual to individual, from race to race, from country to country and from generation to generation.

Within Canada concentration of population in relatively few centres has raised social problems in both large and small communities. Differences in social conditions often result from the constraints placed on regional development by natural resource distribution and transportation facilities. Urbanization is not necessarily a problem in itself. Difficulties arise mainly from the rate of settlement growth or decline. What is called for is a more balanced pattern of communities of varying size.

Improvements in urban planning and urban environmental management have shown that cities need not be negative blots on the landscape. Attention is being directed to problems of water, air and noise pollution and to the inadequacies of planning and management of human settlements. Much more remains to be done in these areas.

The social programs and political approaches of governments significantly affect the quality of their citizens' lives, at least in relation to basic needs. However, too often such programs and approaches reflect a lack of consideration of human and environmental values. National priorities accord first place to national security and health. Economic development comes second and environmental quality third. Periods of economic or political crises reduce concern with the latter area. Depending upon the nature and severity of the crisis this may result in environmental diseconomies. Thus, in the longer term, the individual's opportunities for sharing in the benefits of economic growth are reduced.

The disparity between the quality of life in Canada and that of developing countries is great. Generous action by Canada is called for to remedy this situation. At the same time, Canada's efforts on the international scene must not result in the neglect of her many internal quality of life problems.

The quality of life depends in part on man's ability to use his environment judiciously and to exploit its resources with prudence. Government regulation may be necessary in some cases. However the solution does not lie only in this direction. The attitudes of people can significantly affect environmental conditions. When people appreciate their environment and realize that their behaviour toward it is crucial to its preservation, more is accomplished than any amount of government restriction or control can bring about.

Implications for Canada of the U.N. Recommendations

Measures taken to improve the quality of life require some gauge of their effectiveness. Economic indicators such as GNP are frequently applied, and often erroneously. Increased effort must be made to understand the problem and to develop a measure that will reflect not only economic considerations but social and environmental ones as well. Such indicators are necessary to the evaluation of alternatives and to the costing of various levels of quality.

The desired level of life quality is a subjective matter and difficult to determine. This makes standards or objectives almost impossible to define. However, certain elemental needs are easy to establish. Broadly speaking, a basic level of health, employment and social opportunity is needed by every citizen if he is to realize his personal aspirations and, thereby, to contribute to improving the quality of life of the nation as a whole.

Numerous studies have been made in specific areas of elemental needs. Because such studies tend to emphasize health or employment or social opportunity, there is a need for a consolidated approach which will reflect their inter-relationships. This will enable common areas to be defined and programs set in motion which can bring about the most effective results.

Inequities in the sharing of the burdens imposed by a technological society must be corrected. These inequities may be regional, as when a community is exposed to pollutants released by nearby industries, or mineral processing plants. Or they may be societal. Planned obsolescence may impose unnecessary expenditures on low income groups.

The burden of environmental responsibility must be shifted to the source of the problem by recourse to environmental protection legislation and the application and acceptance of the "polluter must pay" principle.

Governments are increasingly recognizing the validity of requests for assistance on behalf of those whose health has been adversely affected by contaminants and pollutants. This, however, has been approached primarily from a health standpoint. Governments have assumed obligations under various programs which do not yet properly reflect the responsibility of the party which created the adverse environmental condition.

There is a number of policy issues to which governments should devote serious attention. One of these is whether ordinary legal aid should be available to low-income individuals and impecunious groups for environmental lawsuits. A closely related question is whether it is appropriate for governments to extend special ad hoc financing to cover the legal costs of opponents of environmentally significant projects. A more fundamental issue is whether governments should respond to contemporary pressures by introducing legislation to expand traditional common law remedies in this field, for instance by imposing 'strict' or 'absolute' liability or by broadening the basis upon which those persons suffering environmental harm are to be granted 'standing' to sue in the courts.

Major components in determining the quality of life are the physical and mental health of humans and the conditions under which man works, lives and plays. Good health and employment are obviously necessary for the enjoyment of home and leisure environments.

The health of Canadians is protected by three levels of government and each is showing increasing concern about the conditions that make people physically and mentally sick. Much attention is now being given to the effects of environmental pollutants and contaminants. There is general recognition, however, that common standards leading to some uniformity in pollution control are needed.

The quality of life naturally affects the quality of work. Efforts are being made to develop social indicators of the quality of life in the areas of work. There is a need for greater inter-agency consultation and collaboration in the development of such tools.

Technological change and economic growth must be reconciled with environmental quality, but the extent to which environmental policies may limit development and hence employment is a valid area of concern. National and international policies may also affect employment through changes in trade patterns. Measures will sometimes be necessary to mitigate economic and social dislocation resulting from the application of such policies.

The size, distribution and consumption per capita of human populations are primary factors affecting the ability of the environment to support a given quality of life. Canada's present population size may not represent a major problem internally, but it does have significant repercussions internationally in terms of excessive per capita consumption of resources.

In the eyes of the world, Canada is not considered to have a population problem. However, her 22.5 million people have a high rate of per capita consumption and also an advanced resource use technology which has a heavy environmental impact. Considering its total area, the amount of land in Canada suitable for habitation is very small. The country's population is also concentrated in cities, and rural areas are more and more being vacated.

Movement to urban centres occurs basically because of the belief that cities offer a better quality of life. The trend could be reversed if programs were implemented to satisfy human needs in the less populated areas. Decentralization of industry and the provision of better services in the rural areas could provide partial solutions to the problem.

The movement of people within and between urban centres also calls for early attention. Man's need for transportation in work and leisure is unquestioned, but the present wasteful use of resources in transportation must be re-evaluated in terms of resource consumption per capita. The finite nature of the fossil fuel resource, in particular, must be recognized. A related issue is the demand for expanded road systems which, in turn, rule out alternative land uses to the detriment of the natural environment.

In the matter of housing there are several areas of major concern. Adequate shelter and its attendant facilities contribute to the home, work and leisure environments and directly influence mental and physical health. Aesthetic considerations should be incorporated in building and settlement design and provision made for recreation. It is desirable that cultural and life-style diversity be safeguarded.

Increasing attention is being paid to the constraints imposed on housing by the limited availability of land. In some cases this is dictated by physical factors, but in many others speculation has raised land prices to a level beyond the means of many Canadians. Pressures are also imposed because a major portion of direct local government revenue comes from site ownership or use. The trend towards high density occupation is thus accelerated. The dollar income cost of open space is treated as a "loss item", and the effect of high density on the mental and physical health of man is ignored. This situation is, of course, aggravated when the supply of service facilities cannot keep pace with demand.

Those recommendations relating to assistance to less developed countries are primarily directed to the Secretary General of the United Nations or the various U.N. agencies. Action by Canada in these instances will be in response to requests from these sources. Every effort should be made to implement requests that are in keeping with the spirit of the Principles of Stockholm whenever they lie within Canada's competence. The development of assistance programs should recognize that there is a heirarchy of needs and that the elemental needs must be satisfied first. In addition, it must be borne in mind that the quality of life is a subjective concept and programs should therefore provide the means of attaining the quality requested rather than seek to impose some other standard.

Programs should be designed to meet the objective stated in recommendation seven of the Stockholm Conference: "...provide equal possibilities for everybody, both by training and by ensuring access to relevant means and information, to influence their own environment by themselves...". Technical training is one form of assistance Canada can contribute to the less developed countries. Such training should be in those fields where Canada has experienced the same, or related problems. The programs developed for this purpose should involve persons from all levels of government and industry having pertinent expertise. Canadian personnel assistance sent to other countries under such programs should similarly be recruited from a number of sectors so that the experience gained can be widely disseminated later.

Efforts directed to the improvement of the quality of life must consider environmental and social impact. Environmental assessment and design must be components of those aid programs concerned with resource exploitation. In addition, assistance programs should ensure that the cultural heritage of the receiving country is adequately protected against submersion by the imposition of the social, economic and spiritual values of the donor.

Recommendations for Canadian Action

It is recommended that governments:

1. *cooperate in developing a model of social accountability which would account for the costs and benefits of the total impact of environmental change upon all aspects of our society including not only the economic, but the social and psychological effects as well;*

2. *develop a national population policy by undertaking studies related to population growth rates and distribution, and per capita resource consumption;*

3. *provide assistance to persons seeking damages in the courts for injuries to their health or property by contaminants or pollutants;*

4. *monitor health risks attendant upon the use of or exposure to toxic substances in the work environment;*

5. *minimize the risk of environmental damage in the manufacture, transportation, handling and storage of environmentally hazardous materials;*

6. *reduce pressures on public service facilities through flexible working hours, adjustment of shift schedules, and the decentralization of working sites;*

7. *improve the accessibility of public recreational facilities. Public recreational areas should be designed to provide opportunity for multiple activities to fill the needs of all income groups;*

8. *foster the diversity of culture and life-styles of Canada's peoples;*

9. *ensure that access to health care, employment and an adequate home and leisure environment are available to all citizens regardless of their location, economic situation or position in the social structure.*

CHAPTER VIII

THE CANADIAN PERSPECTIVE

Canadian response to the 1972 United Nations Conference on the Human Environment requires an on-going, dynamic process involving federal, provincial and municipal levels of government as far ahead as we can see. As a first step, this document portrays Canada's problems and opportunities in the preservation of a quality environment and a viable resource base.

Relative to much of the world, the Canadian perspective is excellent. Canada has a rich resource base. Our population has not yet overrun the carrying capacity of these resources. Most importantly, there is a growing recognition that however abundant, our resources are not infinite and we cannot continue to pass on to the environment the ever-increasing costs of our drive to consume more resources. It is therefore with a good deal of optimism that the task force points out opportunities to put to the test a national resolve to maintain favourable environmental quality in Canada.

In the past few years, we have come to recognize the complexity of the problem of preserving environmental quality. A solution cannot be sought by attacking one aspect of the problem in isolation. Knowing the demands placed upon the resources of governments, there is a strong temptation to set up priorities with the implicit suggestion that the problems can be addressed in sequence. Such a temptation should be resisted.

A policy to conserve energy is not practical in the long term without action in several policy areas such as transportation. Similarly, a policy to implement environmental quality objectives will eventually break down without consideration to managing land use and population distribution. It is therefore recommended that firm and immediate action be initiated on a number of fronts simultaneously.

The implementation of a national energy policy is a basic to the maintenance of a favourable environmental perspective. Such a policy must insure that:

1. Per capita consumption of energy be controlled and, if necessary, decreased in the long term to a level capable of being sustained with renewable resources.

2. Priority is given to the development of new sources of energy, including those which do not consume non-renewable resources or pass on large quantities of waste to the environment.

3. All alternatives for energy development and transmission are examined critically for engineering, environmental and social costs.

A resource inventory must be taken and kept up-dated so that we may know the extent of our national resource base. Such an inventory should take into account the quantity, quality and distribution of the resources as well as the environmental costs associated with their exploitation.

A comprehensive resource inventory should provide a basic backdrop to managing land use to achieve social, economic and environmental objectives. It is recommended that a program to protect land and its associated renewable resources receive immediate attention. Such a program should recognize:

1. Effective measures to preserve prime agricultural lands, watershed areas and recreational land, and to protect unique and significant ecological areas and historical and cultural sites.

2. The need for a clearly defined process to resolve resource conflicts with the solution seeking long-term, as well as short-term, objectives.

3. Protection of the coastal zone and the relationship between the land and our marine resources.

Along with land and energy policies, a new thrust must be made in transportation. A transportation policy must address itself to:

1. Development of new, efficient, public transportation systems.

2. The impact of transportation on non-renewable resource consumption.

3. The availability of amenities away from congested urban areas.

In consideration of resource use and environmental conflicts, it is recommended that both federal and provincial governments implement environmental impact studies as a planning tool preceding major resource and development decisions. Public consultation must be incorporated early and remain an integral feature of the environmental impact assessment process.

The task of coping with the recent recognition of a limited resource base and an environment with limited capacity to assimilate our inefficiencies is one which requires a national awareness and a national will. It is therefore imperative that programs of environmental awareness receive more consideration in government action. Such programs consider the need for an increased awareness in the public and throughout all government departments and agencies.

Our scientists and those of other countries have provided us with the knowledge of the safe levels below which most contaminants must be kept in order to protect our environment. What is now required is a commitment at all levels of government to set and implement environmental quality objectives. This must be done in consort with an economic and resource policy that will ensure that one-industry towns and primary resource based economies do not have unreasonable hardships imposed upon them.

The task of maintaining environmental quality objectives becomes an impossible one if we do not find new and imaginative ways of eliminating our waste of materials and energy. An objective of government policy must be to produce major advances in waste recycling. We must place research priority in areas where recycling technology is inadequate. In other cases, our economic policies should serve as an instrument to allow recycled materials to be competitive in the market place.

Finally, without managing the number and distribution of people in Canada, programs in resource use, energy and land use will eventually be frustrated. A demographic policy and program for Canada is the foundation of a national environmental program. Considering that there is a time lag of a generation between implementation and achieving results, such a program cannot be instigated too soon. A demographic policy must consider the distribution as well as the total numbers of people, because Canada has, at the same time, underpopulated and overpopulated areas.

Canada's environmental perspective would not be complete without consideration of our international obligations. As a signator of the Stockholm Declaration, Canada has declared its intent to implement the principles agreed upon. It is recommended that the federal and provincial governments act in concert to set up a timetable to implement the national and international programs arising from the Stockholm Declaration. Further, it is recommended that all future government programs be assessed against the Stockholm Declaration to ensure they reflect its spirit and intent.

In summary, the task force recommends that immediate action be taken in the areas of concern highlighted in this Chapter. In addition governments are urged to implement, in a coordinated manner, the recommendations set out in the earlier chapters of this report.

APPENDIX

RECOMMENDATIONS ADOPTED BY THE UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT, JUNE, 1972

RECOMMENDATIONS ADOPTED BY THE UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT

RECOMMENDATION 1

The planning, improvement and management of rural and urban settlements demand an approach, at all levels, which embraces all aspects of the human environment, both natural and man-made. Accordingly, it is recommended:

(a) That all development assistance agencies, whether international, such as the United Nations Development Program and the International Bank for Reconstruction and Development, regional or national, should in their development assistance activities also give high priority within available resources to requests from Governments for assistance in the planning of human settlements, notably in housing, transportation, water, sewerage and public health, the mobilization of human and financial resources, the improvement of transitional urban settlements and the provision and maintenance of essential community services, in order to achieve as far as possible the social well-being of the receiving country as a whole;

(b) That these agencies also be prepared to asssist the less industrialized countries in solving the environmental problems of development projects; to this end they should actively support the training and encourage the recruitment of requisite personnel, as far as possible within these countries themselves.

RECOMMENDATION 2

1. It is recommended that Governments should designate to the Secretary-General areas in which they have committed themselves (or are prepared to commit themselves) to a long-term program of improvement and global promotion of the environment.

(a) In this connexion, countries are invited to share internationally all relevant information on the problems they encounter and the solutions they devise in developing these areas.

(b) Countries concerned will presumably appoint an appropriate body to plan such a program, and to supervise its implementation, for areas which could vary in size from a city block to a national region; presumably, too, the program will be designated to serve, among other purposes, as a vehicle for the preparation and launching of experimental and pilot projects.

(c) Countries which are willing to launch an improvement program should be prepared to welcome international cooperation, seeking the advice or assistance of competent international bodies.

2. It is further recommended:

(a) That in order to ensure the success of the program, Governments should urge the Secretary-General to undertake a process of planning and coordination whereby contact would be established with nations likely to participate in the program; international teams of experts might be assembled for that purpose;

(b) That a Conference/Demonstration on Experimental Human Settlements should be held under the auspices of the United Nations in order to provide for coordination and the exchange of information and to demonstrate to world public opinion the potential of this approach by means of a display of experimental projects;

(c) That nations should take into consideration Canada's offer to organize such a Conference/Demonstration and to act as host to it.

RECOMMENDATION 3

Certain aspects of human settlements can have international implications, for example, the "export" of pollution from urban and industrial areas, and the effects of seaports on international hinterlands. Accordingly, it is recommended that the attention of Governments be drawn to the need to consult bilaterally or regionally whenever environmental conditions or development plans in one country could have repercussions in one or more neighbouring countries.

RECOMMENDATION 4

1. It is recommended that Governments and the Secretary-General, the latter in consultation with the appropriate United Nations agencies, take the following steps:

(a) Entrust the overall responsibility for an agreed program of environmental research at the international level to any central body that may be given the coordinating authority in the field of the environment, taking into account the coordination work already being provided on the regional level, especially by the Economic Commission for Europe;

(b) Identify, wherever possible, an existing agency within the United Nations system as the principal focal point for initiating and coordinating research in each principal area and, where there are competing claims, establish appropriate priorities;

(viii) Physical, mental and social effects of stresses created by living and working conditions in human settlements, particularly urban conglomerates, for example the accessibility of buildings to persons whose physical mobility is impaired (principal bodies responsible: International Labour Organization, World Health Organization, United Nations Educational, Scientific and Cultural Organization, Department of Economic and Social Affairs of the United Nations Secretariat).

2. It is further recommended that Governments consider co-operative arrangements to undertake the necessary research whenever the abovementioned problem areas have a specific regional impact. In such cases, provision should be made for the exchange of information and research findings with countries of other geographical regions sharing similar problems.

RECOMMENDATION 5

It is recommended:

(a) That Governments take steps to arrange for the exchange of visits by those who are conducting research in the public or private institutions of their countries;

(b) That Governments and the Secretary-General ensure the acceleration of the exchange of information concerning past and on-going research, experimentation and project implementation covering all aspects of human settlements, which is conducted by the United Nations system or by public or private entities including academic institutions.

RECOMMENDATION 6

It is recommended that Governments and the Secretary-General give urgent attention to the training of those who are needed to promote integrated action on the planning, development and management of human settlements.

RECOMMENDATION 7

It is recommended:

(a) That Governments and the Secretary-General provide equal possibilities for everybody, both by training and by ensuring access to relevant means and information, to influence their own environment by themselves;

(b) That Governments and the Secretary-General ensure that the institutions concerned shall be strengthened and that special training activities shall be established, making use of existing projects of regional environmental development, for the

(c) Designate the following as priority areas for research:

(i) Theories, policies and methods for the comprehensive environmental development of urban and rural settlements;

(ii) Methods of assessing quantitative housing needs and of formulating and implementing phased programs designed to satisfy them (principal bodies responsible: Department of Economic and Social Affairs of the United Nations Secretariat, regional economic commissions and United Nations Economic and Social Office in Beirut);

(iii) Environmental socio-economic indicators of the quality of human settlements, particularly in terms of desirable occupancy standards and residential densities, with a view to identifying their time trends;

(iv) Socio-economic and demographic factors underlying migration and spatial distribution of population, including the problem of transitional settlements (principal bodies responsible: Department of Economic and Social Affairs of the United Nations Secretariat (Centre for Housing, Building and Planning), United Nations Educational, Scientific and Cultural Organization, World Health Organization, International Labour Organization, Food and Agriculture Organization of the United Nations);

(v) Designs, technologies, financial and administrative procedures for the efficient and expanded production of housing and related infra-structure, suitably adapted to local conditions;

(vi) Water supply, sewerage and waste-disposal systems adapted to local conditions, particularly in semi-tropical, tropical, Arctic and sub-Arctic areas (principal bodies responsible: World Health Organization);

(vii) Alternative methods of meeting rapidly increasing urban transportation needs (principal bodies responsible: Department of Economic and Social Affairs of the United Nations Secretariat (Resources and Transport Division and Centre for Housing, Building and Planning));

benefit of the less industrialized countries, covering the following:

(i) Intermediate and auxiliary personnel for national public services who, in turn, would be in a position to train others for similar tasks (principal bodies responsible: World Health Organization, Department of Economic and Social Affairs of the United Nations Secretariat (Centre for Housing, Building and Planning), United Nations Industrial Development Organization, Food and Agriculture Organization of the United Nations);

(ii) Specialists in environmental planning and in rural development (principal bodies responsible: Department of Economic and Social Affairs of the United Nations Secretariat (Center for Housing, Building and Planning), Food and Agriculture Organization of the United Nations);

(iii) Community developers for self-help programs for low-income groups (principal body responsible: Department of Economic and Social Affairs of the United Nations Secretariat (Centre for Housing, Building and Planning));

(iv) Specialists in working environments (principal bodies responsible: International Labour Organization, Department of Economic and Social Affairs of the United Natons Secretariat (Centre for Housing, Building and Planning), World Health Organization);

(v) Planners and organizers of mass transport systems and services, with special reference to environmental development (principal body responsible: Department of Economic and Social Affairs of the United Nations Secretariat (Resources and Transport Division)).

RECOMMENDATION 8

It is recommended that regional institutions take stock of the requirements of their regions for various environmental skills and of the facilities available to meet those requirements in order to facilitate the provision of appropriate training within regions.

RECOMMENDATION 9

It is recommended that the World Health Organization increase its efforts to support Governments in planning for improving water supply and sewerage services through its community water supply program, taking account, as far as possible, of the framework of total environment programs for communities.

RECOMMENDATION 10

It is recommended that development assistance agencies should give higher priority, where justified in the light of the social benefits, to supporting Governments in financing and setting up services for water supply, disposal of water from all sources, and liquid-waste and solid-waste disposal and treatment as part of the objectives of the Second United Nations Development Decade.

RECOMMENDATION 11

It is recommended that the Secretary-General ensure that during the preparations for the 1974 World Population Conference, special attention shall be given to population concerns as they relate to the environment and, more particularly, to the environment of human settlements.

RECOMMENDATION 12

1. It is recommended that the World Health Organization and other United Nations agencies should provide increased assistance to Governments which so request in the field of family planning programs without delay.

2. It is further recommended that the World Health Organization should promote and intensify research endeavour in the field of human reproduction, so that the serious consequences of population explosion on human environment can be prevented.

RECOMMENDATION 13

It is recommended that the United Nations agencies should focus special attention on the provision of assistance for combating the menace of human malnutrition rampant in many parts of the world. Such assistance will cover training, research and development endeavours on such matters as causes of malnutrition, mass production of high-protein and multipurpose foods, qualitative and quantitative characteristics of routine foods, and the launching of applied nutrition programs.

RECOMMENDATION 14

It is recommended that the intergovernmental body for environmental affairs to be established within the United Nations should ensure that the required surveys shall be made concerning the need and the technical possibilities for developing internationally agreed standards and measuring and limiting noise emissions and that, if it is deemed advisable, such standards shall be applied in the production of means of transportation and certain kinds of working equipment, without a large price increase or reduction in the aid given to developing countries.

RECOMMENDATION 15

It is recommended that the Secretary-General, in consultation with the appropriate United Nations bodies, formulate programs on a world-wide basis to assist countries to meet effectively the requirements of growth of human settlements and to improve the quality of life in existing settlements; in particular, in squatter areas.

RECOMMENDATION 16

The programs referred to in recommendation 15 should include the establishment of subregional centres to undertake, inter alia, the following functions:

(a) Training;
(b) Research;
(c) Exchange of information;
(d) Financial, technical and material assistance.

RECOMMENDATION 17

It is recommended that Governments and the Secretary-General take immediate steps towards the establishment of an international fund or a financial institution whose primary operative objectives will be to assist in strengthening national programs relating to human settlements through the provision of seed capital and the extension of the necessary technical assistance to permit an effective mobilization of domestic resources for housing and the environmental improvement of human settlements.

RECOMMENDATION 18

It is recommended that the following recommendations be referred to the Disaster Relief Coordinator for his consideration, more particularly in the context of the preparation of a report to the Economic and Social Council:

1. It is recommended that the Secretary-General, with the assistance of the Disaster Relief Coordinator and in consultation with the appropriate bodies of the United Nations system and non-governmental bodies:

(a) Assess the over-all requirements for the timely and widespread distribution of warnings which the observational and communications networks must satisfy;

(b) Assess the needs for additional observational networks and other observational systems for natural disaster detection and warnings for tropical cyclones (typhoons, hurricanes, cyclones, etc.) and their associated storms, surges, torrential rains, floods, tsunamis, earthquakes, etc.;

(c) Evaluate the existing systems for the international communication of disaster warnings, in order to determine the extent to which these require improvement;

(d) On the basis of these assessments, promote, through existing national and international organizations, the establishment of an effective world-wide natural disaster warning system, with special emphasis on tropical cyclones and earthquakes, taking full advantage of existing systems and plans, such as the World Weather Watch, the World Meteorological Organization's Tropical Cyclone Project, the International Tsunami Warning System, the World-Wide Standardized Seismic Network and the Desert Locust Control Organization;

(e) Invite the World Meteorological Organization to promote research on the periodicity and intensity of the occurrence of droughts, with a view to developing improved forecasting techniques.

2. It is further recommended that the United Nations Development Program and other appropriate international assistance agencies give priority in responding to requests from Governments for the establishment and improvement of natural disaster research programs and warning systems.

3. It is recommended that the Secretary-General ensure that the United Nations system shall provide to Governments a comphrehensive program of advice and support in disaster prevention. More specifically, the question of disaster prevention should be seen as an integral part of the country program as submitted to, and reviewed by, the United Nations Development Program.

4. It is recommended that the Secretary-General take the necessary steps to ensure that the United Nations system shall assist countries with their planning for pre-disaster preparedness. To this end:

(a) An international program of technical cooperation should be developed, designed to strengthen the capabilities of Governments in the field of pre-disaster planning, drawing upon the services of the resident representatives of the United Nations Development Program;

(b) The Office of Disaster Relief, with the assistance of relevant agencies of the United Nations, should organize plans and programs for international cooperation in cases of natural disasters;

(c) As appropriate, non-governmental international agencies and individual Governments should be invited to participate in the preparation of such plans and programs.

RECOMMENDATION 19

It is recommended that the Food and Agriculture Organization of the United Nations, in cooperation with other relevant international organizations, should include in its program questions relating to rural planning in relation to environmental policy, since environmental policy is formulated in close association with physical planning and with medium-term and long-term economic and social planning. Even in highly industrialized countries, rural areas still cover more than 90 per cent of the territory and consequently should not be regarded as a residual sector and a mere reserve of land and manpower. The Program should therefore include, in particular:

(a) Arrangements for exchanges of such data as are available;

(b) Assistance in training and informing specialists and the public, especially young people, from primary school age onwards;

(c) The formulation of principles for the development of rural areas, which should be understood to comprise not only agricultural areas as such but also small-and medium-sized settlements and their hinterland.

RECOMMENDATION 20

It is recommended that the Food and Agriculture Organization of the United Nations, in cooperation with other international agencies concerned, strengthen the necessary machinery for the international acquisition of knowledge and transfer of experience on soil capabilities, degradation, conservation and restoration, and to this end:

(a) Cooperative information exchange should be facilitated among those nations sharing similar soils, climate and agricultural conditions;

i) The Soil Map of the World being prepared by the Food and Agriculture Organization of the United Nations, the United Nations Educational, Scientific and Cultural Organization and the International Society of Soil Science should serve to indicate those areas among which transfer of knowledge on soil potentialities and soil degradation and restoration would be most valuable;

ii) This map should be supplemented through the establishment of international criteria and methods for the assessment of soil capabilities and degradations and the collection of additional data based upon these methods and criteria. This should permit the preparation of a World Map of Soil Degradation Hazards as a framework for information exchange in this area;

iii) Information exchange on soil use should account for similarities in vegetation and other environmental conditions as well as those of soil, climate, and agricultural practices;

iv) The FAO Soil Data-Processing System should be developed beyond soil productivity considerations, to include the above-mentioned data and relevant environmental parameters, and to facilitate information exchange between national soil institutions, and eventually soil-monitoring stations;

(b) International cooperative research on soil capabilities and conservation should be strengthened and broadened to include:

i) Basic research on soil degradation processes in selected ecosystems under the auspices of the Man and the Biosphere Program. This research should be directed as a matter of priority to those arid areas that are most threatened;

ii) Applied research on soil and water conservation practices under specific land-use conditions with the assistance of the Food and Agriculture Organization of the United Nations and, where appropriate, other agencies (United Nations Educational, Scientific and Cultural Organization, World Health Organization and International Atomic Energy Agency);

iii) Strengthening of existing research centres and, where necessary, establishment of new centres with the object of increasing the production from dry farming areas without any undue impairment of the environment;

iv) Research on the use of suitable soils for waste disposal and recycling; the United Nations Industrial Development Organization, the Food and Agriculture Organization of the United Nations, and the World Health Organization should enter into joint consultations regarding the feasibility of an international program in this area;

(c) These efforts for international cooperation in research and information exchange on soils should be closely associated with those of the UNDP/WMO/FAO/UNESCO program of agricultural biometeorology, in order to facilitate integration of data and practical findings and to support the national programs of conservation of soil resources recommended above;

(d) It should moreover be noted that in addition to the various physical and climatic phenomena which contribute to soil degradation, economic and social factors contribute to it as well; among the economic contributory factors, one which should be particularly emphasized is the payment of inadequate prices for the agricultural produce of developing countries, which prevents farmers in those countries from setting aside sufficient savings for necessary investments in soil regeneration and conservation. Consequently, urgent remedial action should be taken by the organizations concerned to give new value and stability to the prices of raw materials of the developing countries.

RECOMMENDATION 21

It is recommended that Governments, the Food and Agriculture Organization of the United Nations and the World Health Organization, in cooperation with the United Nations Educational, Scientific and Cultural Organization and the International Atomic Energy Agency, strengthen and coordinate international programs for integrated pest control and reduction of the harmful effects of agro-chemicals:

(a) Existing international activities for the exchange of information and cooperative research and technical assistance to developing countries should be strengthened to support the national programs described above, with particular reference to:

i) Basic research on ecological effects of pesticides and fertilizers (MAB);

ii) Use of radio-isotope and radiation techniques in studying the fate of pesticides in the environment (joint IAEA/FAO Division);

iii) Evaluation of the possibility of using pesticides of biological origin in substitution for certain chemical insecticides which cause serious disturbances in the environment;

iv) Dose and timing of fertilizers' application and their effects on soil productivity and the environment (Food and Agriculture Organization of the United Nations);

v) Management practices and techniques for integrated pest control, including biological control (Food and Agriculture Organization of the United Nations and World Health Organization);

vi) Establishment and/or strengthening of national and regional centres for integrated pest control, particularly in developing countries (Food and Agriculture Organization of the United Nations and World Health Organization);

(b) Existing expert committees of the Food and Agriculture Organization of the United Nations and the World Health Organization on various aspects of pest control should be convened periodically:

i) To assess recent advances in the relevant fields of research mentioned above;

ii) To review and further develop international guidelines and standards with special reference to national and ecological conditions in relation to the use of chlorinated hydrocarbons, pesticides containing heavy metals and the use and experimentation of biological controls;

(c) In addition, ad hoc panels of experts should be convened, by the Food and Agriculture Organization of the United Nations, the World Health Organization and, where appropriate, the International Atomic Energy Agency, in order to study specific problems, and facilitate the work of the above-mentioned committees.

RECOMMENDATION 22

It is recommended that the Food and Agriculture Organization of the United Nations, under its "War on Waste" program, place increased emphasis on control and recycling of wastes in agriculture:

(a) This program should assist the national activities relating to:

i) Control and recycling of crop residues and animal wastes;

ii) Control and recycling of agro-industrial waste;

iii) Use of municipal wastes as fertilizers;

(b) The program should also include measures to avoid wasteful use of natural resources through the destruction of unmarketable agricultural products or their use for improper purposes.

RECOMMENDATION 23

It is recommended that Governments, in cooperation with the Food and Agriculture Organization of the United Nations and other agencies and bodies, establish and strengthen regional and international machinery for the rapid development and management of domesticated livestock of economic importance and their related environmental aspects as part of the ecosystems, particularly in areas of low annual productivity, and thus encourage the establishment of regional livestock research facilities, councils and commissions, as appropriate.

RECOMMENDATION 24

It is recommended that the Secretary-General take steps to ensure that the United Nations bodies concerned cooperate to meet the needs for new knowledge on the environmental aspects of forests and forest management:

(a) Where appropriate, research should be promoted, assisted, coordinated, or undertaken by the Man and the Biosphere Program (UNESCO), in close cooperation with the Food and Agriculture Organization of the United Nations and the World Meteorological Organization, and with the collaboration of the International Council of Scientific Unions and the International Union of Forestry Research Organizations;

(b) Research on comparative legislation, land tenure, institutions, tropical forest management, the effects of the international trade in forest products on national forest environments, and public administration, should be sponsored or coordinated by FAO, in cooperation with other appropriate international and regional organizations;

(c) The Food and Agriculture Organization of the United Nations, in conjunction with the United Nations Educational, Scientific and Cultural Organization and other appropriate international organizations, should give positive advice to member countries on the important role of forests with reference to, and in conjunction with, the conservation of soil, watersheds, the protection of tourist sites and wildlife, and recreation, within the over-all framework of the interests of the biosphere.

RECOMMENDATION 25

It is recommended that the Secretary-General take steps to ensure that continuing surveillance, with the cooperation of Member States, of the world's forest cover shall be provided for through the programs of the Food and Agriculture Organization of the United Nations and the United Nations Educational, Scientific and Cultural Organization.

(a) Such a World Forest Appraisal Program would provide basic data, including data on the balance between the world's forest biomass and the prevailing environment, and changes in the forest biomass, considered to have a significant impact on the environment.

(b) The information could be collected from existing inventories and ongoing activities and through remote-sensing techniques;

(c) The forest protection program described above might be incorporated within this effort, through the use of advanced technology, such as satellites which use different types of imagery and which could constantly survey all forests.

RECOMMENDATION 26

It is recommended that the Food and Agriculture Organization of the United Nations coordinate an international program for research and exchange of information on forest fires, pests and diseases:

(a) The program should include data collection and dissemination, identification of potentially susceptible areas and of means of suppression; exchange of information on technologies, equipment and techniques; research, including integrated pest control and the influence of fires on forest ecosystems, to be undertaken by the International Union of Forestry Research Organizations; establishment of a forecasting system in cooperation with the World Meteorological Organization; organization of seminars and study tours; the facilitation of bilateral agreements for forest protection between neighbouring countries, and the development of effective international quarantines;

(b) Forest fires, pests and diseases will frequently each require separate individual treatment.

RECOMMENDATION 27

It is recommended that the Food and Agriculture Organization of the United Nations facilitate the transfer of information on forests and forest management:

(a) The amount of knowledge that can usefully be exchanged is limited by the differences of climatic zones and forest types;

(b) The exchange of information should however be encouraged among nations sharing similarities; considerable knowledge is already exchanged among the industrialized nations of the temperate zone;

(c) Opportunities exist, despite differences, for the useful transfer of information to developing countries on the environmental aspects of such items as:

i) the harvesting and industrialization of some tropical hardwoods;

ii) pine cultures;

iii) the principles of forest management systems and management science;

iv) soils and soil interpretations relating to forest management;

v) water regimes and water-shed management;

vi) forest industries pollution controls, including both technical and economic data;

vii) methods for the evaluation of forest resources through sampling techniques, remote sensing, and data-processing;

viii) control of destructive fires and pest outbreaks; and

ix) coordination in the area of the definition and standardization of criteria and methods for the economic appraisal of forest environmental influences and for the comparison of alternative uses.

RECOMMENDATION 28

It is recommended that the Food and Agriculture Organization of the United Nations strengthen its efforts in support of forestry projects and research projects, possibly for production, in finding species which are adaptable even in areas where this is exceptionally difficult because of ecological conditions.

RECOMMENDATION 29

It is recommended that the Secretary-General ensure that the effect of pollutants upon wildlife shall be considered, where appropriate, within environmental monitoring systems. Particular attention should be paid to those species of wildlife that may serve as indicators for future wide environmental disturbances, and an ultimate impact upon human populations.

RECOMMENDATION 30

It is recommended that the Secretary-General ensure the establishment of a program to expand present data gathering processes so as to assess the total economic value of wildlife resources.

(a) Such data would facilitate the task of monitoring the current situation of animals endangered by their trade value, and demonstrate to questioning nations the value of their resources;

(b) Such a program should elaborate upon current efforts of the Food and Agriculture Organization of the United Nations and might well produce a year-book of wildlife* statistics.

RECOMMENDATION 31

It is recommended that the Secretary-General ensure that the appropriate United Nations agencies cooperate with the Governments of the developing countries to development special short-term training courses on wildlife* management:

(a) Priority should be given to conversion courses for personnel trained in related disciplines such as forestry or animal husbandry;

(b) Special attention should be given to the establishment and support of regional training schools for technicians.

RECOMMENDATION 32

It is recommended that Governments give attention to the need to enact international conventions and treaties to protect species inhabiting international waters or those which migrate from one country to another:

(a) A broadly-based convention should be considered which would provide a framework by which criteria for game regulations could be agreed upon and the over-exploitation of resources curtailed by signatory countries;

(b) A working group should be set up as soon as possible by the appropriate authorities to consider these problems and to advise on the need for, and possible scope of, such conventions or treaties.

*Whereas elsewhere in this report the expression "wildlife" is meant to include both animals and plants, it should be understood here to be restricted to the most important animals.

RECOMMENDATION 33

It is recommended that Governments agree to strengthen the international whaling commission, to increase international research efforts, and as a matter of urgency to call for an international agreement, under the auspices of the international whaling commission and involving all Governments concerned, for a 10-year moratorium on commercial whaling.

RECOMMENDATION 34

It is recommended that Governments and the Secretary-General give special attention to training requirements on the management of parks and protected areas:

(a) High-level training should be provided and supported:

i) In addition to integrating aspects of national parks planning and management into courses on forestry and other subjects, special degrees should be offered in park management; the traditional forestry, soil and geology background of the park manager must be broadened into an integrated approach;

ii) Graduate courses in natural resources administration should be made available in at least one major university in every continent;

(b) Schools offering courses in national park management at a medium-grade level should be assisted by the establishment or expansion of facilities, particularly in Latin America and Asia.

RECOMMENDATION 35

It is recommended that the Secretary-General take steps to ensure that an appropriate mechanism shall exist for the exchange of information on national parks legislation and planning and management techniques developed in some countries which could serve as guidelines to be made available to any interested country.

RECOMMENDATION 36

It is recommended that the Secretary-General take steps to ensure that the appropriate United Nations agencies shall assist the developing countries to plan for the inflow of visitors into their protected areas in such a way as to reconcile revenue and environmental considerations within the context of the recommendations approved by the Conference. The other international organizations concerned may likewise make their contribution.

RECOMMENDATION 37

It is recommended that Governments take steps to coordinate, and cooperate in the management of, neighbouring or contiguous protected areas. Agreement should be reached on such aspects as mutual legislation, patrolling systems, exchange of information, research projects, collaboration on measures of burning, plant and animal control, fishery regulations, censuses, tourist circuits and frontier formalities.

RECOMMENDATION 38

It is recommended that Governments take steps to set aside areas representing ecosystems of international significance for protection under international agreement.

RECOMMENDATION 39

It is recommended that Governments, in cooperation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated, agree to an international program to preserve the world's genetic resources:

(a) Active participation at the national and international level is involved. It must be recognized, however, that while survey, collection, and dissemination of these genetic resources are best carried out on a regional or international basis, their actual evaluation and utilization are matters for specific institutions and individual workers; international participation in the latter should concern exchange of techniques and findings;

(b) An international network is required with appropriate machinery to facilitate the interchange of information and genetic material among countries;

(c) Both static (seed banks, culture collection, etc.) and dynamic (conservation of populations in evolving natural environments) ways are needed.

(d) Action is necessary in six interrelated areas:

(i) Survey of genetic resources;
(ii) Inventory of collections;
(iii) Exploration and collecting;
(iv) Documentation;
(v) Evaluation and utilization;
(vi) Conservation, which represents the crucial element to which all other programs relate;

(e) Although the international program relates to all types of genetic resources, the action required for each resource will vary according to existing needs and activities.

RECOMMENDATION 40

It is recommended that Governments, in cooperation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated, make inventories of the genetic resources most endangered by depletion or extinction:

(a) All species threatened by man's development should be included in such inventories;

(b) Special attention should be given to locating in this field those areas of natural genetic diversity that are disappearing;

(c) These inventories should be reviewed periodically and brought up to date by appropriate monitoring;

(d) The survey conducted by FAO in collaboration with the International Biological Program is designed to provide information on endangered crop genetic resources by 1972, but will require extension and follow-up.

RECOMMENDATION 41

It is recommended that Governments, in cooperation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated, compile or extend, as necessary, registers of existing collections of genetic resources:

(a) Such registers should identify which breeding and experiment stations, research institutions and universities maintain which collections;

(b) Major gaps in existing collections should be identified where material is in danger of being lost;

(c) These inventories of collections should be transformed for computer handling and made available to all potential users;

(d) In respect of plants:

(i) It would be expected that the "advanced varities" would be well represented, but that primitive materials would be found to be scarce and require subsequent action;

(ii) The action already initiated by FAO, several national institutions, and international foundations should be supported and expanded.

(e) In respect of micro-organisms, it is recommended that each nation develop comprehensive inventories of culture collections:

(i) A cataloguing of the large and small collections and the value of their holdings is required, rather than a listing of individual strains;

(ii) Many very small but unique collections, sometimes the works of a single specialist, are lost;

(iii) Governments should make sure that valuable gene pools held by individuals or small institutes are also held in national or regional collections.

(f) In respect of animal germ plasm, it is recommended that FAO establish a continuing mechanism to assess and maintain catalogues of the characteristics of domestic animal breeds, types and varieties in all nations of the world. Likewise, FAO should establish such lists where required.

(g) In respect of aquatic organisms, it is recommended that FAO compile a catalogue of genetic resources of cultivated species and promote intensive studies on the methods of preservation and storage of genetic material.

RECOMMENDATION 42

It is recommended that Governments, in cooperation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated, initiate immediately, in cooperation with all interested parties, programs of exploration and collection wherever endangered species have been identified which are not included in existing collections:

(a) An emergency program with the cooperation of the Man and the Biosphere Program, of plant exploration and collection should be launched on the basis of the FAO List of Emergency Situations for a five-year period;

(b) With regard to forestry species, in addition to the efforts of the Danish/FAO Forest Tree Seed Centre, the International Union of Forestry Research Organizations, and the FAO Panel of Experts on Forest Gene Resources, support is needed for missions planned for Latin America, West Africa, the East Indies and India.

RECOMMENDATION 43

It is recommended that Governments, in cooperation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated:

1. Recognize that conservation is a most crucial part of any genetic resources program. Moreover, major types of genetic resources must be treated separately because:

(a) They are each subject to different programs and priorities;

(b) They serve different uses and purposes;

(c) They require different expertise, techniques and facilities;

2. In respect of plant germ plasms (agriculture and forestry), organize and equip national or regional genetic resources conservation centres:

(a) Such centres as the National Seed Storage Laboratory in the United States of America and the Vavilov Institute of Plant Industry in the Union of Soviet Socialist Republics already provide good examples;

(b) Working collections should be established separately from the basic collections; these will usually be located at plant and breeding stations and will be widely distributed;

(c) Three classes of genetic crop resources must be conserved:

(i) High-producing varieties in current use and those they have superseded;

(ii) Primitive varieties of traditional pre-scientific agriculture (recognized as genetic treasuries for plant improvement);

(iii) Mutations induced by radiation or chemical means;

(d) Species contributing to environmental improvement, such as sedge used to stabilize sand-dunes, should be conserved;

(e) Wild or weed relatives of crop species and those wild species of actual or potential use in rangelands, industry, new crops etc. should be included;

3. In respect of plant germ plasms (agriculture and forestry), maintain gene pools of wild plant species within their natural communities. Therefore:

(a) It is essential that primeval forests, bushlands and grasslands which contain important forest genetic resources be identified and protected by appropriate technical and legal means; systems of reserves exist in most countries, but a strengthening of international understanding on methods of protection and on availability of material may be desired;

(b) Conservation of species of medical, aesthetic or research value should be assured;

(c) The network of biological reserves proposed by UNESCO (Man and the Biosphere Program) should be designed, where feasible, to protect these natural communities;

(d) Where protection in nature becomes uncertain or impossible, then means such as seed storage or living collections in provenance trials or botanic gardens must be adopted;

4. Fully implement the programs initiated by the FAO Panels of Experts on forest gene resources in 1968 and on plant exploration and introduction in 1970;

5. In respect of animal germ plasms, consider the desirability and feasibility of international action to preserve breeds or varieties of animals:

(a) Because such an endeavour would constitute a major effort beyond the scope of any one nation, FAO would be the logical executor of such a project. Close cooperation with Governments would be necessary, however. The International Union for Conservation of Nature and Natural Resources might, logically, be given responsibility for wild species, in cooperation with FAO, the Man and the Biosphere Program (UNESCO), and Governments.

(b) Any such effort should also include research on methods of preserving, storing, and transporting germ plasm;

(c) Specific methods for the maintenance of gene pools of aquatic species should be developed;

(d) The recommendations of the FAO Working Party Meeting on Genetic Selection and Conservation of Genetic Resources of Fish, held in 1971, should be implemented;

6. In respect of micro-organism germ plasma, co-operatively establish and properly fund a few large regional collections:

(a) Full use should be made of major collections now in existence

(b) In order to provide geographical distribution and access to the developing nations, regional centres should be established in Africa, Asia and Latin America and the existing centres in the developed world should be strengthened;

7. Establish conservation centres of insect germ plasm. The very difficult and long process of selecting or breeding insects conducive to biological control programs can being only in this manner.

RECOMMENDATION 44

It is recommended that Governments, in co-operation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated, recognize that evaluation and utilization are critical corollaries to the conservation of genetic resources. In respect of crop-breeding programs, it is recommended that Governments give special emphasis to:

(a) The quality of varieties and breeds and the potential for increased yields;

(b) The ecological conditions to which the species are adapted;

(c) The resistance to diseases, pests and other adverse factors;

(d) The need for a multiplicity of efforts so as to increase the chances of success.

RECOMMENDATION 45

It is recommended that Governments, in cooperation with the Secretary-General of the United Nations and the Food and Agriculture Organization of the United Nations where indicated:

1. Collaborate to establish a global network of national and regional institutes relating to genetic resource conservation based on agreements on the availability of material and information, on methods, on technical standards, and on the need for technical and financial assistance wherever required:

(a) Facilities should be designed to assure the use of the materials and information:

(i) by breeders, to develop varieties and breeds both giving higher yields and having higher resistance to local pests and diseases and other adverse factors; and

(ii) by users providing facilities and advice for the safest and most profitable utilization of varieties and breeds most adapted to local conditions;

(b) Such cooperation would apply to all genetic resource conservation centres and to all types mentioned in the foregoing recommendations;

(c) Standardized storage and retrieval facilities for the exchange of information and genetic material should be developed:

(i) Information should be made generally available and its exchange facilitated through agreement on methods and technical standards;

(ii) International standards and regulations for the shipment of materials should be agreed upon;

(iii) Basic collections and data banks should be replicated in at least two distinct sites, and should remain a national responsibility;

(iv) A standardized and computerized system of documentation is required;

(d) Technical and financial assistance should be provided where required; areas of genetic diversity are most frequently located in those countries most poorly equipped to institute the necessary programs;

2. Recognize that the need for liaison among the parties participating in the global system of genetic resources conservation requires certain institutional innovations. To this end:

(a) It is recommended that the appropriate United Nations agency establish an international liaison unit for plant genetic resources in order:

(i) To improve liaison between governmental and non-governmental efforts;

(ii) To assist in the liaison and cooperation between national and regional centres, with special emphasis on international agreements on methodology and standards of conservation of genetic material, standardization and coordination of computerized record systems, and the exchange of information and material between such centres;

(iii) To assist in implementing training courses in exploration, conservation and breeding methods and techniques;

(iv) To act as a central repository for copies of computerized information on gene pools (discs and tapes);

(v) To provide the secretariat for periodic meetings of international panels and seminars on the subject; a conference on germ plasm conservation might be convened to follow up the successful conference of 1967;

(vi) To plan and coordinate the five-year emergency program on the conservation of endangered species;

(vii) To assist Governments further, wherever required, in implementing their national programs;

(viii) To promote the evaluation and utilization of genetic resources at the national and international levels;

(b) It is recommended that the appropriate United Nations agency initiate the required program on micro-organism germ plasm:

(i) Periodic international conferences involving those concerned with the maintenance of and research on gene pools of micro-organisms should be supported;

(ii) Such a program might interact with the proposed regional culture centres by assuring that each centre places high priority on the training of scientists and technicians from the developing nations; acting as a necessary liaison; and lending financial assistance to those countries established outside the developed countries;

(iii) The international exchange of pure collections of micro-organisms between the major collections of the world has operated for many years and requires little re-enforcement;

(iv) Study should be conducted particularly on waste disposal and recycling, controlling diseases and pests, and food technology and nutrition;

(c) It is recommended that the Food and Agriculture Organization of the United Nations institute a program in respect of animal germ plasm to assess and maintain catalogues of the economic characteristics of domestic animal breeds and types and of wild species and to establish gene pools of potentially useful types;

(d) It is recommended that the Man and the Biosphere project on the conservation of natural areas and the genetic material contained therein should be adequately supported.

RECOMMENDATION 46

It is recommended that Governments, and the Secretary-General in cooperation with the Food and Agriculture Organization of the United Nations and other United Nations organizations concerned, as well as development assistance agencies, take steps to support recent guidelines, recommendations and programs of the various international fishing organizations. A large part of the needed international action has been identified with action programs

initiated by FAO and its Intergovernmental Committee on Fisheries and approximately 24 other bilateral and multilateral international commissions, councils and committees. In particular these organizations are planning and undertaking:

(a) Cooperative programs such as that of LEPOR (Long-Term and Expanded Program of Oceanic Research), GIPME (Global Investigation of Pollution in the Marine Environment) and IBP (International Biological Program);

(b) Exchange of data, supplementing and expanding the services maintained by FAO and bodies within its framework in compiling, disseminating and coordinating information on living aquatic resources and their environment and fisheries activities;

(c) Evaluation and monitoring of world fishery resources, environmental conditions, stock assessment, including statistics on catch and effort, and the economics of fisheries;

(d) Assistance to Governments in interpreting the implications of such assessments, identifying alternative management measures, and formulating required actions;

(e) Special programs and recommendations for management of stocks of fish and other aquatic animals proposed by the existing international fishery bodies. Damage to fish stocks has often occurred because regulatory action is taken too slowly. In the past, the need for management action to be nearly unanimous has reduced action to the minimum acceptable level.

RECOMMENDATION 47

It is recommended that Governments, and the Secretary-General of the United Nations in cooperation with the Food and Agriculture Organization of the United Nations and other United Nations organizations concerned, as well as development assistance agencies take steps to ensure close participation of fishery agencies and interests in the preparations for the United Nations Conference on the Law of the Sea. In order to safeguard the marine environment and its resources through the development of effective and workable principles and laws, the information and insight of international and regional fishery bodies, as well as the national fishery agencies are essential.

RECOMMENDATION 48

It is recommended that Governments, and the Secretary-General in cooperation with the Food and Agriculture Organization of the United Nations and other United Nations organizations concerned, as well as development assistance agencies, take steps to ensure

international cooperation in the research, control and regulation of the side effects of national activities in resource utilization where these affect the aquatic resources of other nations:

(a) Estuaries, intertidal marshes, and other near-shore and in-shore environments play a crucial role in the maintenance of several marine fish stocks. Similar problems exist in those fresh-water fisheries that occur in shared waters;

(b) Discharge of toxic chemicals, heavy metals, and other wastes may affect even high-seas resources;

(c) Certain exotic species, notably the carp, lamprey and alewife, have invaded international waters with deleterious effects as a result of unregulated unilateral action.

RECOMMENDATION 49

It is recommended that Governments, and the Secretary-General of the United Nations in cooperation with the Food and Agriculture Organization of the United Nations and other United Nations organizations concerned, as well as development assistance agencies, take steps to develop further and strengthen facilities for collecting, analysing and disseminating data on living aquatic resources and the environment in which they live:

(a) Data already exist concerning the total harvest from the oceans and from certain regions in respect of individual fish stocks, their quantity, and the fishing efforts expended on them, and in respect of their population structure, distribution and changes. This coverage needs to be improved and extended;

(b) It is clear that a much greater range of biological parameters must be monitored and analysed in order to provide an adequate basis for evaluating the interaction of stocks and managing the combined resources of many stocks. There is no institutional constraint on this expansion but a substantial increase in funding is needed by FAO and other international organizations concerned to meet this expanding need for data;

(c) Full utilization of present and expanded data facilities is dependent on the cooperation of Governments in developing local and regional data networks, making existing data available to FAO and to the international bodies, and formalizing the links between national and international agencies responsible for monitoring and evaluating fishery resources.

RECOMMENDATION 50

It is recommended that Governments, and the Secretary-General of the United Nations in cooperation with the Food and Agriculture Organization of the United Nations and other United Nations organizations concerned, as well as development assistance agencies, take steps to ensure full cooperation among Governments by strengthening the existing international and regional machinery for development and management of fisheries and their related environmental aspects and, in those regions where these do not exist, to encourage the establishment of fishery councils and commissions as appropriate.

(a) The operational efficiency of these bodies will depend largely on the ability of the participating countries to carry out their share of the activities and programs;

(b) Technical support and servicing from the specialized agencies, in particular from FAO, is also required;

(c) The assistance of bilateral and international funding agencies will be needed to ensure the full participation of the developing countries in these activities.

RECOMMENDATION 51

It is recommended that Governments concerned consider the creation of river-basin commissions or other appropriate machinery for cooperation between interested States for water resources common to more than one jurisdiction.

(a) In accordance with the Charter of the United Nations and the principles of international law full consideration must be given to the right of permanent sovereignty of each country concerned to develop its own resources;

(b) The following principles should be considered by the States concerned when appropriate:

(i) Nations agree that when major water resource activities are contemplated that may have a significant environmental effect on another country, the other country should be notified well in advance of the activity envisaged;

(ii) The basic objective of all water resource use and development activities from the environmental point of view is to ensure the best use of water and to avoid its pollution in each country;

(iii) The net benefits of hydrologic regions common to more than one national jurisdiction are to be shared equitably by the nations affected;

(c) Such arrangements, when deemed appropriate by the States concerned, will permit undertaking on a regional basis:

(i) Collection, analysis, and exchanges of hydrologic data through some international mechanism agreed upon by the States concerned;

(ii) Joint data-collection programs to serve planning needs;

(iii) Assessment of environmental effects of existing water uses;

(iv) Joint study of the causes and symptoms of problems related to water resources, taking into account the technical, economic, and social considerations of water quality control;

(v) Rational use, including a program of quality control, of the water resource as an environmental asset;

(vi) Provision for the judicial and administrative protection of water rights and claims;

(vii) Prevention and settlement of disputes with reference to the management and conservation of water resources;

(viii) Financial and technical cooperation of a shared resource;

(d) Regional conferences should be organized to promote the above considerations.

RECOMMENDATION 52

It is recommended that the Secretary-General take steps to ensure that appropriate United Nations bodies support government action where required:

1. Reference is made to the Food and Agriculture Organization of the United Nations, the World Health Organization, the World Meteorological Organization, the Department

of Economic and Social Affairs of the United Nations Secretariat (Resources and Transport Division), the United Nations Educational, Scientific and Cultural Organization/International Hydrological Decade, the regional economic commissions and the United Nations Economic and Social Office in Beirut. For example:

(a) The Food and Agriculture Organization of the United Nations has established a Commission on Land and Water Use for the Middle East which promotes regional co-operation in research, training and information, inter alia on water management problems;

(b) The World Health Organization has available the International Reference Centre for Waste Disposal located at Dübendorf, Switzerland, and International Reference Centre on Community Water Supply in the Netherlands;

(c) The World Meteorological Organization has a Commission on Hydrology which provides guidance on data collection and on the establishment of hydrological networks;

(d) The Resources and Transport Division of the Department of Economic and Social Affairs, United Nations Secretariat, has the United Nations Water Resources Development Centre;

(e) The United Nations Educational, Scientific and Cultural Organization is sponsoring the International Hydrological Decade program of coordinated research on the quality and quantity of world water resources.

2. Similar specialized centres should be established at the regional level in developing countries for training research and information exchange on:

(a) Inland water pollution and waste disposal in cooperation with the World Health Organization, the Food and Agriculture Organization of the United Nations, the United Nations regional economic commissions and the United Nations Economic and Social Office in Beirut;

(b) Water management for rain-fed and irrigated agriculture, by the Food and Agriculture Organization of the United Nations in cooperation with the regional economic commissions and the United Nations Economic and Social Office in Beirut;

(c) Integrated water resources planning and management in co-operation with the Department of Economic and Social Affairs of the United Nations Secretariat (Resources and Transport Division), the regional economic commissions, and the United Nations Economic and Social Office in Beirut.

RECOMMENDATION 53

It is recommended that Secretary-General take steps to ensure that United Nations system is prepared to provide technical and financial assistance to Governments when requested in the different functions of water resources management:

(a) Surveys and inventories;

(b) Water resources administration and policies, including:

(i) The establishment of institutional frameworks;

(ii) Economic structures of water resources management and development;

(iii) Water resources law and legislation;

(c) Planning and management techniques, including:

(i) The assignment of water quality standards;

(ii) The implementation of appropriate technology;

(iii) More efficient use and re-use of limited water supplies;

(d) Basic and applied studies and research;

(e) Transfer of existing knowledge;

(f) Continuing support of the program of the International Hydrological Decade.

RECOMMENDATION 54

It is recommended that the Secretary-General take steps to establish a roster of experts who would be available to assist Governments, upon request, to anticipate and evaluate the environmental effects of major water development projects. Governments would have the opportunity of consulting teams of experts drawn from this roster, in the first stages of project planning. Guidelines could be prepared to assist in the review and choices of alternatives.

RECOMMENDATION 55

It is recommended that the Secretary-General take steps to conduct and exploratory program to assess the actual and potential environmental effects of water management upon the oceans, define terms and estimate the costs for a comprehensive program of action, and establish and maintain as far as possible:

(a) A world registry of major or otherwise important rivers arranged regionally and classified according to their discharge of water and pollutants;

(b) A world registry of clean rivers which would be defined in accordance with internationally agreed quality criteria and to which nations would contribute on a voluntary basis:

(i) The oceans are the ultimate recipient for the natural and man-made wastes discharges into the river systems of the continents;

(ii) Changes in the amount of river-flow into the oceans, as well as in its distribution in space and time, may considerably affect the physical, chemical and biological regime of the estuary regions and influence the oceanic water systems;

(iii) It would be desirable for nations to declare their intention to have admitted to the world registry of clean rivers those rivers within their jurisdiction that meet the quality criteria as defined and to declare their further intention to ensure that certain other rivers shall meet those quality criteria by some target date.

RECOMMENDATION 56

It is recommended that the Secretary-General provide the appropriate vehicle for the exchange of information on mining and mineral processing.

(a) Improved accessibility and dissemination of existing information is required; the body of literature and experience is already larger than one would think.

(b) Possibilities include the accumulation of information on:

(i) the environmental conditions of mine sites;

(ii) the action taken in respect of the environment; and

(iii) the positive and negative environmental repercussions.

(c) Such a body of information could be used for prediction. Criteria for the planning and management of mineral production would emerge and would indicate where certain kinds of mining should be limited, where recalmation costs would be particularly high, or where other problems would arise.

(d) The appropriate United Nations bodies should make efforts to assist the developing countries by, inter alia, providing adequate information for each country on the technology for preventing present or future environmentally adverse effects of mining and the adverse health and safety effects associated with the mineral industry, and by accepting technical trainees and sending experts.

RECOMMENDATION 57

It is recommended that the Secretary-General take steps to ensure proper collection, measurement and analysis of data relating to the environmental effects of energy use and production within appropriate monitoring systems.

(a) The design and operation of such networks should include, in particular, monitoring the environmental levels resulting from emission of carbon dioxide, sulphur dioxide, oxidants, nitrogen oxides (NOx), heat and particulates, as well as those from releases of oil and radioactivity:

(b) In each case the objective is to learn more about the relationships between such levels and the effects on weather, human health, plant and animal life, and amenity values.

RECOMMENDATION 58

It is recommended that the Secretary-General take steps to give special attention to providing a mechanism for the exchange of information on energy:

(a) The rationalization and integration of resource management for energy will clearly require a solid understanding of the complexity of the problem and of the multiplicity of alternative solutions;

(b) Access to the large body of existing information should be facilitated:

(i) Data on the environmental consequences of different energy systems should be provided through an exchange of national experiences, studies, seminars, and other appropriate meetings;

(ii) A continually updated register of research involving both entire systems and each of its stages should be maintained.

RECOMMENDATION 59

It is recommended that the Secretary-General take steps to ensure that a comprehensive study be promptly undertaken with the aim of submitting a first report, at the latest in 1975, on available energy sources, new technology, and comsumption trends, in order to assist in providing a basis for the most effective development of the world's energy resources, with due regard to the environmental effects of energy production and use: such a study to be carried out in collaboration with appropriate international bodies such as the International Atomic Energy Agency and the Organization for Economic Cooperation and Development.

RECOMMENDATION 60

It is recommended that the Secretary-General, in cooperation with Governments concerned and the appropriate international agencies, arrange for systematic audits of natural resource development projects in representative ecosystems of international significance to be undertaken jointly with the governments concerned after, and where feasible before, the implementation of such projects.

RECOMMENDATION 61

It is recommended that the Secretary-General, in cooperation with the Governments concerned and the appropriate international agencies, provide that pilot studies be conducted in representative ecosystems of international significance to assess the environmental impact of alternative approaches to the survey, planning and development of resource projects.

RECOMMENDATION 62

It is recommended that the Secretary-General, in cooperation with Governments concerned and the appropriate international agencies, provide that studies be conducted to find out the connexion between the distribution of natural resources and people's welfare and the reasons for possible discrepancies.

RECOMMENDATION 63

It is recommended that the Secretary-General take steps to ensure that international development assistance agencies, in cooperation with recipient Governments, intensify efforts to revise and broaden the criteria of development project analysis to incorporate environmental impact considerations.

RECOMMENDATION 64

It is recommended that the Secretary-General take steps to ensure that the United Nations agencies concerned undertake studies on the relative costs and benefits of synthetic versus natural products serving identical uses.

RECOMMENDATION 65

It is recommended that the Man and the Biosphere Program be vigorously pursued by the United Nations Educational, Scientific and Cultural Organization in cooperation with other United Nations organizations and other international scientific organizations.

RECOMMENDATION 66

It is recommended that World Meteorological Organization initiate or intensify studies on the interrelationships of resource development and meteorology.

RECOMMENDATION 67

It is recommended that the Secretary-General, in cooperation with interested Governments and United Nations specialized agencies, take the necessary steps to encourage the further development of remote-sensing techniques for resources surveys and the utilization of these techniques on the basis of proper international arrangements.

RECOMMENDATION 68

It is recommended that the Secretary-General, in cooperation with the appropriate agencies of the United Nations and other international organizations, promote jointly with interested Governments the development of methods for the integrated planning and management of natural resources, and provide, when requested, advice to Governments on such methods, in accordance with the particular environmental circumstances of each country.

RECOMMENDATION 69

It is recommended that the Food and Agriculture Organization of the United Nations expand its present program on the stabilization of marginal lands.

RECOMMENDATION 70

It is recommended that Governments be mindful of activities in which there is an appreciable risk of effects on climate, and to this end:

(a) Carefully evaluate the likelihood and magnitude of climatic effects and disseminate their findings to the maximum extent feasible before embarking on such activities;

(b) Consult fully other interested States when activities carrying a risk of such effects are being comtemplated or implemented.

RECOMMENDATION 71

It is recommended that Governments use the best practicable means available to minimize the release to the environment of toxic or dangerous substances, especially if they are persistent substances such as heavy metals and organochlorine compounds, until it has been demonstrated that their release will not give rise to unacceptable risks or unless their use is essential to human health or food production, in which case appropriate control measures should be applied.

RECOMMENDATION 72

It is recommended that in establishing standards for pollutants of international significance, Governments take into account the relevant standards proposed by competent international organizations, and concert with other concerned Governments and the competent international organizations in planning and carrying out control programs for pollutants distributed beyond the national jurisdiction from which they are released.

RECOMMENDATION 73

It is recommended that Governments actively support, and contribute to, international programs to acquire knowledge for the assessment of pollutant sources, pathways, exposures and risks and that those Governments in a position to do so provide educational, technical and other forms of assistance to facilitate broad participation by countries regardless of their economic or technical advancement.

RECOMMENDATION 74

It is recommended that the Secretary-General, drawing on the resources of the entire United Nations system, and with the active support of Governments and appropriate scientific and other international bodies:

(a) Increase the capability of the United Nations system to provide awareness and advance warning of deleterious effects to human health and well-being from man-made pollutants;

(b) Provide this information in a form which is useful to policy-makers at the national level;

(c) Assist those Governments which desire to incorporate these and other environmental factors into national planning processes;

(d) Improve the international acceptability of procedures for testing pollutants and contaminants by:

(i) International division of labour in carrying out the large-scale testing programs needed;

(ii) Development of international schedules of tests for evaluation of the environmental impact potential of specific contaminants or products. Such a schedule of tests should include consideration of both short-term and long-term effects of all kinds, and should be reviewed and brought up to date from time to time to take into account new knowledge and techniques;

(iii) Development and implementation of an international intercalibration program for sampling and analytical techniques to permit more meaningful comparisons of national data;

(iv) Develop plans for an International Registry of Data on Chemicals in the Environment based on a collection of available scientific data on the environmental behaviour of the most important man-made chemicals and containing production figures of the potentially most harmful chemicals, together with their pathways from factory via utilization to ultimate disposal or recirculation.

RECOMMENDATION 75

It is recommended that without reducing in any way their attention to non-radioactive pollutants, Governments should:

(a) Explore with the International Atomic Energy Agency and the World Health Organization the feasibility of developing a registry of releases to the biosphere of significant quantities of radioactive materials;

(b) Support and expand, under the International Atomic Energy Agency and appropriate international organizations, international cooperation on radioactive waste problems, including problems of mining and tailings and also including coordination of plans for the siting of fuel-reprocessing plants in relation to the siting of the ultimate storage areas, considering also the transportation problems.

RECOMMENDATION 76

It is recommended:

(a) That a major effort be undertaken to develop monitoring and both epidemiological and experimental research programs providing data for early warning and prevention of the deleterious effects of the various environmental agents, acting singly or in combination, to which man is increasingly exposed, directly or indirectly, and for the assessment of their potential risks to human health, with particular regard to the risks of mutagenicity, teratogenicity and carcinogenicity. Such programs should be guided and coordinated by the World Health Organization;

(b) That the World Health Organization coordinate the development and implementation of an appropriate international collection and dissemination system to correlate medical, environmental and family-history data;

(c) That Governments actively support and contribute to international programs for research and development of guidelines concerning environmental factors in the work environment.

RECOMMENDATION 77

It is recommended that the World Health Organization, in collaboration with the relevant agencies, in the context of an approved program, and with a view to suggesting necessary action, assist Governments, particularly those of developing countries, in undertaking coordinated programs of monitoring of air and water and in establishing monitoring systems in areas where there may be a risk to health from pollution.

RECOMMENDATION 78

It is recommended that internationally coordinated programs of research and monitoring of food contamination by chemical and biological agents be established and developed jointly by the Food and Agriculture Organization of the United Nations and the World Health Organization, taking into account national programs, and that the results of monitoring be expeditiously assembled, evaluated and made available so as to provide early information on rising trends of contamination and on levels that may be considered undesirable or may lead to unsafe human intakes.

RECOMMENDATION 79

It is recommended:

(a) That approximately 10 baseline stations be set up, with the consent of the States involved, in areas remote from all sources of pollution in order to monitor long-term global trends in atmospheric constituents and properties which may cause changes in meteorological properties, including climatic changes;

(b) That a much larger network of not less than 100 stations be set up, with the consent of the States involved, for monitoring properties and constituents of the atmosphere on a regional basis and especially changes in the distribution and concentration of contaminants;

(c) That these programs be guided and coordinated by the World Meteorological Organization;

(d) That the World Meteorological Organization, in cooperation with the International Council of Scientific Unions (ICSU), continue to carry out the Global Atmospheric Research Program (GARP), and if necessary establish new programs to understand better the general circulation of the atmosphere and the causes of climatic changes whether these causes are natural or the result of man's activities.

RECOMMENDATION 80

It is recommended that the Secretary-General ensure:

(a) That research activities in terrestrial ecology be encouraged, supported and coordinated through the appropriate agencies, so as to provide adequate knowledge of the inputs, movements, residence times and ecological effects of pollutants identified as critical;

(b) That regional and global networks of existing and, where necessary, new research stations, research centres, and biological reserves be designated or established within the framework of the Man and the Biosphere Program (MAB) in all major ecological regions, to facilitate intensive analysis of the structure and functioning of ecosystems under natural or managed conditions;

(c) That the feasibility of using stations participating in this program for surveillance of the effects of pollutants on ecosystems be investigated;

(d) That programs such as the Man and the Biosphere Program be used to the extent possible to monitor:

    (i) the accumulation of hazardous compounds in biological and abiotic material at representative sites;

(ii) the effect of such accumulation on the reproductive success and population size of selected species.

RECOMMENDATION 81

It is recommended that the World Health Organization, together with the international organizations concerned, continue to study, and establish, primary standards for the protection of the human organism, especially from pollutants that are common to air, water and food, as a basis for the establishment of derived working limits.

RECOMMENDATION 82

It is recommended that increased support be given to the Codex Alimentarius Commission to develop international standards for pollutants in food and a code of ethics for international food trade, and that the capabilities of the Food and Agriculture Organization of the United Nations and the World Health Organization to assist materially and to guide developing countries in the field of food control be increased.

RECOMMENDATION 83

It is recommended that the appropriate United Nations agencies develop agreed procedures for setting derived working limits for common air and water contaminants.

RECOMMENDATION 84

It is recommended that Governments make available, through the International Referral System established in pursuance of recommendation 101 of this Conference, such information as may be requested on their pollution research and pollution control activities, including legislative and administrative arrangements, research on more efficient pollution control technology, and cost-benefit methodology.

RECOMMENDATION 85

It is recommended that any mechanism for co-ordinating and stimulating the actions of the different United Nations organs in connexion with environmental problems include among its functions:

(a) Development of an internationally accepted procedure for the identification of pollutants of international significance and for the definition of the degree and scope of international concern;

(b) Consideration of the appointment of appropriate intergovernmental, expert bodies to assess quantitatively the exposures, risks, pathways and sources of pollutants of international significance;

(c) Review and co-ordination of international co-operation for pollution control, ensuring in particular that needed measures shall be taken and that measures taken in regard to various media and sources shall be consistent with one another;

(d) Examination of the needs for technical assistance to Governments in the study of pollution problems, in particular those involving international distribution of pollutants;

(e) Encouragement of the establishment of consultation mechanisms for speedy implementation of concerted abatement programs with particular emphasis on regional activities.

RECOMMENDATION 86

It is recommended that Governments, with the assistance and guidance of appropriate United Nations bodies, in particular the Joint Group of Experts on the Scientific Aspects of Marine Pollution(GESAMP):

(a) Accept and implement available instruments on the control of the maritime sources of marine pollution;

(b) Ensure that the provisions of such instruments are complied with by ships flying their flags and by ships operating in areas under their jurisdiction and that adequate provisions are made for reviewing the effectiveness of, and revising, existing and proposed international measures for control of marine pollution;

(c) Ensure that ocean dumping by their nationals anywhere, or by any person in areas under their jurisdiction, is controlled and that Governments shall continue to work towards the completion of, and bringing into force as soon as possible of, an over-all instrument for the control of ocean dumping as well as needed regional agreements within the framework of this instrument, in particular for enclosed and semi-enclosed seas, which are more at risk from pollution;

(d) Refer the draft articles and annexes contained in the report of the intergovernmental meetings at Reykjavik, Iceland, in April 1972 and in London in May 1972 to the United Nations Committee on the Peaceful Uses of the Seabed and the Ocean Floor beyond the Limits of National Jurisdiction at its session in July/

August 1972 for information and comments and to a conference of Governments to be convened by the Government of the United Kingdom of Great Britain and Northern Ireland in consultation with the Secretary-General of the United Nations before November 1972 for further consideration, with a view to opening the proposed convention for signature at a place to be decided by that Conference, preferably before the end of 1972;

(e) Participate fully in the 1973 Intergovernmental Maritime Consultative Organization (IMCO) Conference on Marine Pollution and the Conference on the Law of the Sea scheduled to begin in 1973, as well as in regional efforts, with a view to bringing all significant sources of pollution within the marine environment, including radioactive pollution from nuclear surface ships and submarines, and in particular in enclosed and semi-enclosed seas, under appropriate controls and particularly to complete elimination of deliberate pollution by oil from ships, with the goal of achieving this by the middle of the present decade;

(f) Strengthen national controls over land-based sources of marine pollution, in particular in enclosed and semi-enclosed seas, and recognize that, in some circumstances, the discharge of residual heat from nuclear and other power-stations may constitute a potential hazard to marine ecosystems.

RECOMMENDATION 87

It is recommended that Governments:

(a) Support national research and monitoring efforts that contribute to agreed international programs for research and monitoring in the marine environment, in particular the Global Investigation of Pollution in the Marine Environment (GIPME) and the Integrated Global Ocean Station System (IGOSS);

(b) Provide to the United Nations, the Food and Agriculture Organization of the United Nations and the United Nations Conference on Trade and Development, as appropriate to the data-gathering activities of each, statistics on the production and use of toxic or dangerous substances that are potential marine pollutants, especially if they are persistent;

(c) Expand their support to components of the United Nations system concerned with research and monitoring in the marine environment and adopt the measures required to improve the constitutional, financial and operational basis under which the Intergovernmental Oceanographic Commission is at present operating so as to make it an effective joint mechanism for the Governments and United Nations organizations concerned (United Nations Educational, Scientific and Cultural Organization, Food and Agriculture Organization of the United Nations, World Meteorological Organization, Inter-Governmental Maritime Consultative Organization, United Nations) and in order that it may be able to take on additional responsibilities for the promotion and coordination of scientific programs and services.

RECOMMENDATION 88

It is recommended that the Secretary-General, together with the sponsoring agencies, make it possible for the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP);

(a) To re-examine annually, and revise as required, its "Review of Harmful Chemical Substances", with a view to elaborating further its assessment of sources, pathways and resulting risks of marine pollutants;

(b) To assemble, having regard to other work in progress, scientific data and to provide advice on scientific aspects of marine pollution, especially those of an interdisciplinary nature.

RECOMMENDATION 89

It is recommended that Secretary-General ensure:

(a) That mechanisms for combining world statistics on mining, production, processing, transport and use of potential marine pollutants shall be developed along with methods for identifying high-priority marine pollutants based in part on such data;

(b) That the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), in consultation with other expert groups, propose guidelines for test programs to evaluate toxicity of potential marine pollutants;

(c) That the Food and Agriculture Organization of the United Nations, the World Health Organization, the Intergovernmental Oceanographic Commission and the International Atomic Energy Agency encourage studies of the effects of high-priority marine pollutants on man and other organisms, with appropriate emphasis on chronic, low-level exposures;

(d) That the Intergovernmental Oceanographic Commission, with the Food and Agriculture Organization of the United Nations and the World Health Organization, explore the possibility of establishing an international institute for tropical marine studies, which would undertake training as well as research.

RECOMMENDATION 90

It is recommended that the Intergovernmental Oceanographic Commission, jointly with the World Meteorological Organization and, as appropriate, in co-operation with other interested intergovernmental bodies, promote the monitoring of marine pollution, preferably within the framework of the Integrated Global Ocean Station System (IGOSS), as well as the development of methods for monitoring high-priority marine pollutants in the water, sediments and organisms, with advice from the Joint Group of Experts on the Scientific Aspects of Marine

Pollution (GESAMP) on intercomparability of methodologies.

RECOMMENDATION 91

It is recommended that the Intergovernmental Oceanographic Commission:

(a) Ensure that provision shall be made in international marine research, monitoring and related activities for the exchange, dissemination, and referral to sources of data and information on baselines and on marine pollution and that attention shall be paid to the special needs of developing countries;

(b) Give full consideration, with the Food and Agriculture Organization of the United Nations, the World Meteorological Organization, the Inter-Governmental Maritime Consultative Organization, the World Health Organization, the International Atomic Energy Agency, the International Hydrographic Organization and the International Council for the Exploration of the Sea and other interested and relevant organizations, to the strengthening of on-going marine and related data and information exchange and dissemination activities;

(c) Support the concept of development of an interdisciplinary and interorganizational system primarily involving centres already in existence;

(d) Initiate an interdisciplinary marine pollution data and scientific information referral capability.

RECOMMENDATION 92

It is recommended:

(a) That Governments collectively endorse the principles set forth in paragraph 197 of Conference document A/CONF.48/8 as guiding concepts for the Conference on the Law of the Sea and the Inter-Governmental Maritime Consultative Organization (IMCO) Marine Pollution Conference scheduled to be held in 1973 and also the statement of objectives agreed on at the second session of the Intergovernmental Working Group on Marine Pollution, which reads as follows:

> "The marine environment and all the living organisms which it supports are of vital importance to humanity, and all people have an interest in assuring that this environment is so managed that its quality and resources are not impaired. This applies especially to coastal area resources. The capacity of the sea to assimilate wastes and render them harmless and its ability to regenerate natural resources are not unlimited. Proper management is required and measures to prevent and control marine pollution must be regarded as an

essential element in this management of the ocean and seas and their natural resources."

and that, in respect of the particular interest of coastal States in the marine environment and recognizing that the resolution of this question is a matter for consideration at the Conference on the Law of the Sea, they take note of the principles on the rights of coastal States discussed but neither endorsed nor rejected at the second session of the Intergovernmental Working Group on Marine Pollution and refer those principles to the 1973 Inter-Governmental Maritime Consultative Organization Conference for information and to the 1973 Conference on the Law of the Sea for such action as may be appropriate;

(b) That Governments take early action to adopt effective national measures for the control of all significant sources of marine pollution, including land-based sources, and concert and coordinate their actions regionally and where appropriate on a wider international basis;

(c) That the Secretary-General, in cooperation with appropriate international organizations, endeavour to provide guidelines which Governments might wish to take into account when developing such measures.

RECOMMENDATION 93

It is recommended that any mechanism for co-ordinating and stimulating the actions of the different United Nations organs in connexion with environmental problems include among its functions over-all responsibility for ensuring that needed advice on marine pollution problems shall be provided to Governments.

RECOMMENDATION 94

It is recommended that the Secretary-General, with the co-operation of United Nations bodies, take steps to secure additional financial support to those training and other programs of assistance that contribute to increasing the capacity of developing countries to participate in international marine research, monitoring and pollution-control programs.

RECOMMENDATION 95

It is recommended that the Secretary-General make arrangements for the United Nations system:

(a) To provide countries on request with the necessary technical and financial assistance in preparing national reports on the environment, in setting up machinery for monitoring environmental developments from the social and cultural standpoint and, in particular, in drawing up national social, educational and cultural programs;

(b) To support and encourage projects for continuing co-operation among national social, educational and cultural programs, including their economic aspects, in an international network. The organizations of the United Nations system, including the regional economic commissions and the United Nations Economic Social Office in Beirut, will be called upon to participate in this activity, as will other international governmental and non-governmental agencies;

(c) To organize the exchange of information on experience, methods and work in progress in connexion with continuous social diagnosis, particularly at the regional level and between regions with common problems;

(d) To facilitate the development of social and cultural indicators for the environment, in order to establish a common methodology for assessing environmental developments and preparing reports on the subject;

(e) To prepare, on the basis of the national reports on the state of, and outlook for, the environment, periodic reports on regional or subregional situations and on the international situation in this matter.

The activities described above could be co-ordinated by the new bodies for environmental co-ordination, taking into account the priorities agreed upon according to the resources available. International bodies responsible for technical and financial co-operation and assistance could also help in carrying out these tasks.

RECOMMENDATION 96

1. It is recommended that the Secretary-General, the organizations of the United Nations system, especially the United Nations Educational, Scientific and Cultural Organization, and the other international agencies concerned, should, after consultation and agreement, take the necessary steps

to establish an international program in environmental education, interdisciplinary in approach, in school and out of school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen living in rural and urban areas, youth and adult alike, with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment. A program of technical and financial co-operation and assistance will be needed to support this program, taking into account the priorities agreed upon according to the resources available. This program should include, among other things:

(a) The preparation of an inventory of existing systems of education which include environmental education;

(b) The exchange of information on such systems and, in particular, disemination of the results of experiments in teaching;

(c) The training and retraining of professional workers in various disciplines at various levels(including teacher training);

(d) Consideration of the formation of groups of experts in environmental disciplines and activities, including those concerning the economic, sociological, tourist and other sectors, in order to facilitate the exchange of experience between countries which have similar environmental conditions and comparable levels of development;

(e) The development and testing of new materials and methods for all types and levels of environmental education.

2. It is further recommended that United Nations Educational, Scientific and Cultural Organization, under the Man and the Biosphere Program, the World Health Organization, the Food and Agricultural Organization of the United Nations, the United Nations Industrial Development Organization, the World Meteorological Organization and all the organizations concerned, including the scientific unions co-ordinated by the International Council of Scientific Unions, should develop their activities in studying desirable innovations in the training of specialists and technicians and, in collaboration with the United Nations Development Program, should encourage the institution, at the regional and the international level, of courses and training periods devoted to the environment.

3. It is further recommended that international organizations for voluntary service, and, in particular, the International Secretariat for Volunteer Service, should include environmental skills in the services they provide, in consultation with the United Nations Development Program through the United Nations Volunteer Program.

RECOMMENDATION 97

1. It is recommended that the Secretary-General make arrangements:

(a) To establish an information program designed to create the awareness which individuals should have of environmental issues and to associate the public with environmental management and control. This program will use traditional and contemporary mass media of communication, taking distinctive national conditions into account. In addition, the program must provide means of stimulating active participation by the citizens, and of eliciting interest and contributions from non-governmental organizations for the preservation and development of the environment;

(b) To institute the observance of a World Environment Day;

(c) For the preparatory documents and official documents of the Conference to be translated into the widest possible range of languages and circulated as widely as possible;

(d) To integrate relevant information on the environment in all its various aspects into the activities of the information organs of the United Nations system;

(e) To develop technical co-operation, particularly through and between the United Nations regional economic commissions and the United Nations Economic and Social Office in Beirut.

2. It is also recommended that the Secretary-General and the development agencies make arrangements to use and adapt certain international development programs-provided that this can be done without delaying their execution - so as to improve the dissemination of information and to strengthen community action on environment problems, especially among the oppressed and underprivileged peoples of the earth.

RECOMMENDATION 98

It is recommended that Governments, with the assistance of the Secretary-General, the Food and Agricultural Organization of the United Nations, the United Nations Educational, Scientific and Cultural Organization and the other international and regional intergovernmental and non-governmental agencies concerned, should continue the preparation of the present and future conventions required for the conservation of the world's natural resources and cultural heritage. In the course of this preparatory work, Governments should consider the possibility of putting into operation systems of protection for elements of the world heritage, under which those Governments that wish to save elements of their national heritage of universal value would be able to obtain from the international community, on request, the technical and financial assistance required to bring their efforts to fruition.

RECOMMENDATION 99

1. It is recommended that Governments should:

(a) Noting that the draft convention prepared by United Nations Educational, Scientific and Cultural Organization concerning the protection of the world natural and cultural heritage marks a significant step towards the protection, on an international scale, of the environment, examine this draft convention with a view to its adoption at the next General Conference of UNESCO;

(b) Whenever appropriate, sign the Convention on Conservation of Wetlands of International Importance;

2. It is recommended that the Secretary-General, in consultation with the competent agencies of the United Nations system and the non-governmental organizations concerned, make arrangements for a detailed study of all possible procedures for protecting certain islands for science;

3. It is recommended that a plenipotentiary conference be convened as soon as possible, under appropriate governmental or intergovernmental auspices, to prepare and adopt a convention on export, import and transit of certain species of wild animals and plants.

RECOMMENDATION 100

It is recommended that the Secretary-General make arrangements:

(a) To be kept informed of national pilot schemes for new forms of environmental management;

(b) To assist countries, on request, with their research and experiments;

(c) To organize the international exchange of in- information collected on this subject.

RECOMMENDATION 101

It is recommended that the Secretary-General take the appropriate steps, including the convening of an expert meeting, to organize an International Referral Service for sources of environmental information, taking into account the model described in paragraphs 129 to 136 of the report on educational, informational, social and cultural aspects of environmental issues (A/CONF.48/9), in order to assist in the successful implementation of all the recommendations made in respect of those aspects of environmental issues and of most of the recommendations envisaged in the other substantive subject areas covered in the Conference agenda.

RECOMMENDATION 102

It is recommended that the appropriate regional organizations give full consideration to the following steps:

(a) Preparing short-term and long-term plans at regional, subregional and sectoral levels for the study and identification of the major environmental problems faced by the countries of the region concerned as well as the special problems of the least developed countries with coast-lines and inland lakes and rivers exposed to the risk of marine and other forms of pollution;

(b) Evaluating the administrative, technical and legal solutions to various environmental problems in terms of both preventive and remedial measures, taking into account possible alternative and/or multidisciplinary approaches to development;

(c) Preparation, within the framework of international agreements, of legislative measures designed to protect marine (and fresh-water) fisheries resources within the limits of their national jurisdiction;

(d) Increasing and facilitating, in the context of development and as proposed in the World Plan of Action for the Application of Science and Technology to Development, the acquisition and distribution of information and experience to member countries through global and regional co-operation, with particular emphasis on an international information referral networks approach and on a regular exchange of information and observation among the regional organizations;

(e) Establishing facilities for the exchange of information and experience between less industrialized countries which, although situated in different regions, share similar problems as a result of common physical, climatic and other factors;

(f) Encouraging the training of personnel in the techniques of incorporating environmental considerations into developmental planning, and of identifying and analysing the economic and social cost-benefit relationships of alternative approaches;

(g) Establishing criteria, concepts and a terminology of the human environment through interdisciplinary efforts;

(h) Establishing and disseminating information on the significant environmental problems of each region and the nature and result of steps taken to cope with them;

(i) Providing and co-ordinating technical assistance activities directed towards establishing systems of environmental research, information and analysis at the national level;

(j) Assisting developing countries, in co-operation with appropriate international agencies, in promoting elementary education, with emphasis on hygiene, and in developing and applying suitable methods for improving health, housing, sanitation and water supply, and controlling soil erosion. Emphasis should be placed on techniques promoting the use of local labour and utilizing local materials and local expertise in environmental management;

(k) Encouraging the appropriate agencies and bodies within the United Nations to assist the developing countries, at their request, in establishing national science, technology and research policies to enable the developing countries to acquire the capacity to identify and combat environmental problems in the early planning and development stages. In this respect, special priority should be accorded to the type of research, technology and science which would help developing countries speed up, without adverse environment effects, the exploration, exploitation, processing and marketing of their natural resources.

RECOMMENDATION 103

It is recommended that Governments take the necessary steps to ensure:

(a) That all countries present at the Conference agree not to invoke environmental concerns as a pretext for discriminatory trade policies or for reduced access to markets and recognize further that the burdens of the environmental policies of the industrialized countries should not be transferred, either directly or indirectly, to the developing countries. As a general rule, no country should solve or disregard its environmental problems at the expense of other countries;

(b) That where environmental concerns lead to restrictions on trade, or to stricter environmental standards with negative effects on exports, particularly from developing countries, appropriate measures for compensation should be worked out within the framework of existing contractual and institutional arrangements and any new such arrangements that can be worked out in the future;

(c) That the General Agreement of Tariffs and Trade, among other international organizations, could be used for the examination of the problems, specifically through the recently established Group on Environmental Measures and International Trade and through its general procedures for bilateral and multilateral adjustment of differences;

(d) That whenever possible (that is, in cases which do not require immediate discontinuation of imports), countries should inform their trading partners in advance about the intended action in order that there might be an opportunity to consult within the GATT Group on Environmental Measures and International Trade, among other international organizations. Assistance in meeting the consequences of stricter environmental standards ought to be given in the form of financial or technical assistance for research with a view to removing the obstacles that the products of developing countries have encountered;

(e) That all countries agree that uniform environmental standards should not be expected to be applied universally by all countries with respect to given industrial processes or products except in those cases where environmental disruption may constitute a concern to other countries. In addition, in order to avoid an impairment of the access of the developing countries to the markets of the industrialized countries because of differential product standards, Governments should aim at world-wide harmonization of such standards. Environmental standards should be established, at whatever levels are necessary, to safeguard the environment, and should not be directed towards gaining trade advantages;

towards gaining trade advantages;

(f) That the Governments and the competent international organizations keep a close watch on medium - and long-term trends in international trade and take measures with a view to promoting:

(i) The exchange of environmental protection technologies;

(ii) International trade in natural products and commodities which compete with synthetic products that have a greater capacity for pollution.

RECOMMENDATION 104

It is recommended that the Secretary-General ensure:

(a) That appropriate steps shall be taken by the existing United Nations organizations to identify the major threats to exports, particularly those of developing countries, that arise from environmental concerns, their character and severity, and the remedial action that may be envisaged;

(b) That the United Nations system, in co-operation with other governmental and non-governmental agencies working in this field, should assist Governments to develop mutually acceptable common international environmental standards on products which are considered by Governments to be of significance in foreign trade. Testing and certification procedures designed to ensure that the products conform to these standards should be such as to avoid arbitrary and discriminatory actions that might affect the trade of developing countries.

RECOMMENDATION 105

It is recommended that the General Agreement of Tariffs and Trade, the United Nations Conference on Trade and Development and other international bodies, as appropriate, should, within their respective fields of competence, consider undertaking to monitor, assess, and regularly report the emergence of tariff and non-tariff barriers to trade as a result of environmental policies.

RECOMMENDATION 106

It is recommended:

(a) That the Secretary-General, in co-operation with other international bodies as appropriate, should examine the extent to which the problems of pollution could be ameliorated by a reduction in the current levels of production and in the future rate of growth of the production of synthetic products and substitutes which,

in their natural form, could be produced by developing countries; and make recommendations for national and international action;

(b) That Governments of the developing countries consider fully the new opportunities that may be offered to them to establish industries and/or expand existing industries in which they may have comparative advantages because of environmental considerations, and that special care be taken to apply the appropriate international standards on environment in order to avoid the creation of pollution problems in developing countries;

(c) That the Secretary-General, in consultation with appropriate international agencies, undertake a full review of the practical implications of environmental concerns in relation to distribution of future industrial capacity and, in particular, to ways in which the developing countries may be assisted to take advantage of opportunities may be assisted to take advantage of opportunities and to minimize risks in this area.

RECOMMENDATION 107

It is recommended that the Secretary-General, in collaboration with appropriate international agencies, ensure that a study be conducted of appropriate mechanisms for financing international environmental action, taking into account General Assembly resolution 2849(XXVI)

RECOMMENDATION 108

It being recognized that it is in the interest of mankind that the technologies for protecting and improving the environment be employed universally, it is recommended that the Secretary-General be asked to undertake studies, in consultation with Governments and appropriate international agencies, to find means by which environmental technologies may be made available for adoption by developing countries under terms and conditions that encourage their wide distribution without constituting an unacceptable burden to developing countries.

RECOMMENDATION 109

It is recommended that the Secretary-General, in collaboration with appropriate international agencies, take steps to ensure that the environmental considerations of an international nature related to the foregoing recommendations be integrated into the review and appraisal of the International Development Strategy for the Second Development Decade in such a way that the flow of international aid to developing countries is not hampered. Recommendations for national action, proposed by the Secretary-General of the Conference, shall be referred to Governments for their consideration and, when deemed appropriate, should be taken into account in the

review and appraisal process during the consideration of matters for national action as included in the International Development Strategy. It should further be ensured that the preoccupation of developed countries with their own environmental problems should not affect the flow of assistance to developing countries, and that this flow should be adequate to meet the additional environmental requirements of such countries.