

Stockholm and beyond : report.

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STOCKHOLM AND BEYOND

Report of the
Secretary
of State's
Advisory
Committee
on
the
1972
United
Nations
Conference
on
the
Human
Environment



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The Secretary of State's Advisory Committee for the 1972 U.N. Conference on the Human Environment

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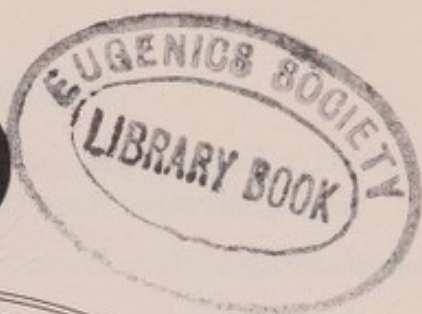


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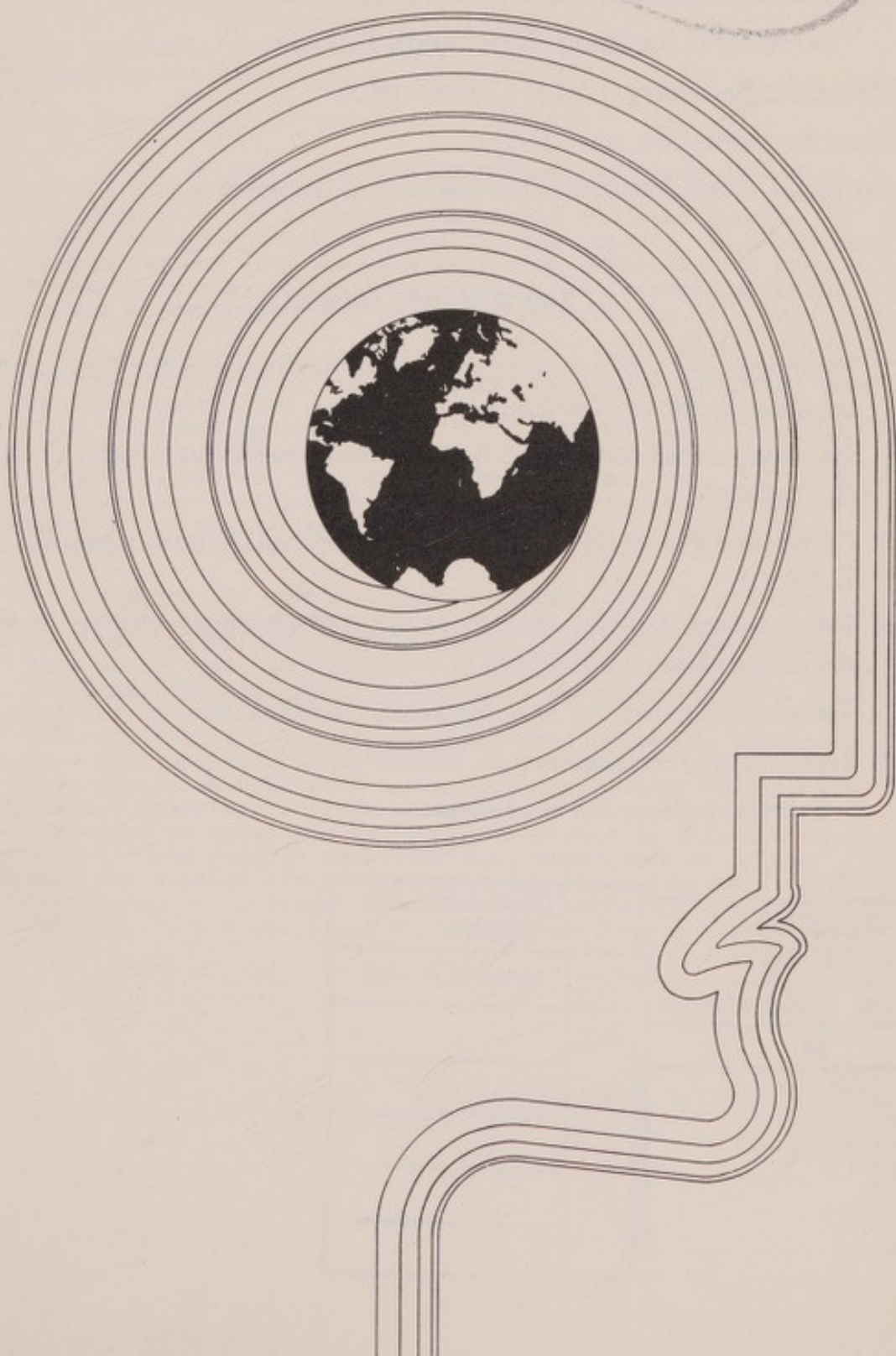
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May 1972



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HOWARD H. BAKER, JR.
TENNESSEE

United States Senate

WASHINGTON, D.C. 20510

April 27, 1972

The Honorable William P. Rogers
Secretary of State

Dear Mr. Secretary:

In my capacity as Chairman of your Advisory Committee on the United Nations Conference on the Human Environment, it gives me great pleasure to transmit the Committee's final recommendations in the following report. This report represents the fruition of a year-long effort by the 27-member Committee to actively involve the interested public in our government's preparations for Stockholm.

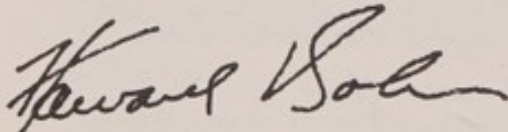
Our primary vehicle for soliciting this citizen input has been a series of regional public hearings conducted over the past year. The first hearing was held in Miami last July, followed by one in Washington last November, and then six others held during March in New York, Chicago, San Francisco, Denver, Houston, and Washington. Over 300 invitations were sent to a broad range of interests requesting citizens to either testify at a hearing or submit written statements and over 170 people accepted our invitations.

Another 300 people submitted their views in writing in lieu of an appearance at a hearing. The transcripts of the hearings as well as the written responses accompanying this report reflect the diverse sources of information which the Committee enlisted. Scientists, doctors, lawyers, labor leaders, industrialists, environmental activists, and private citizens, while differing in their strategies for mankind's survival, wholeheartedly agreed to the need for bold collective action on behalf of the common environment all nations share. There was further unanimity of opinion on the significance of involving the American public in this country's domestic and foreign policy-making, especially at a time when the average citizen feels increasingly removed from the day-to-day proceedings of Government. Although I realize that we are not the first Advisory Committee to assist your

Department in formulating official policy, I feel that in one respect we have established an important precedent that bears repeating. This is the release by your Department of draft conventions and draft United States positions for public scrutiny prior to their being tabled in an international forum. The release of the draft conventions on Ocean Dumping, Endangered Species, Islands for Science, and World Heritage Trust served to illustrate that government and a concerned citizenry can indeed form a mutually beneficial partnership. While not specifically recommending the continuation of this advisory committee, I wish to emphasize the significance of establishing some form of citizens advisory mechanism to bridge the gap between government and its constituency.

I would like to call your attention to the prompt and gracious efforts of the Rockefeller, McClellan, and Ford Foundations, which provided funding for staff; and the University of Georgia Law School and the Environmental Protection Agency, which lent staff members to the effort. Needless to say, your able Assistant for Environmental Affairs, Mr. Christian A. Herter, Jr. made an invaluable contribution to the Committee's efforts.

Sincerely,

A handwritten signature in dark ink, appearing to read "Howard Baker", with a stylized, flowing script.

Howard H. Baker, Jr.
Chairman

THE SECRETARY OF STATE
WASHINGTON

REC'D MAY 3

May 1, 1972

Dear Howard:

The report of the Advisory Committee on the 1972 United Nations Conference on the Human Environment is most gratefully received. The report is exemplary evidence of the successful work of the Committee due in large measure to your extensive personal participation and the strong and effective leadership contributed to this endeavor. Each member of the Committee deserves our thanks for his personal participation. The Committee staff is to be congratulated for its untiring efforts and the high quality of its work.

The involvement of the American public in the preparatory process required by the United States Government to effectively participate in an international Conference such as planned for Stockholm is, I agree, most important. Your Committee has set a most useful precedent. I also concur in the suggestion that a mechanism for continuing consultation in this area between the Government and the public is most desirable.

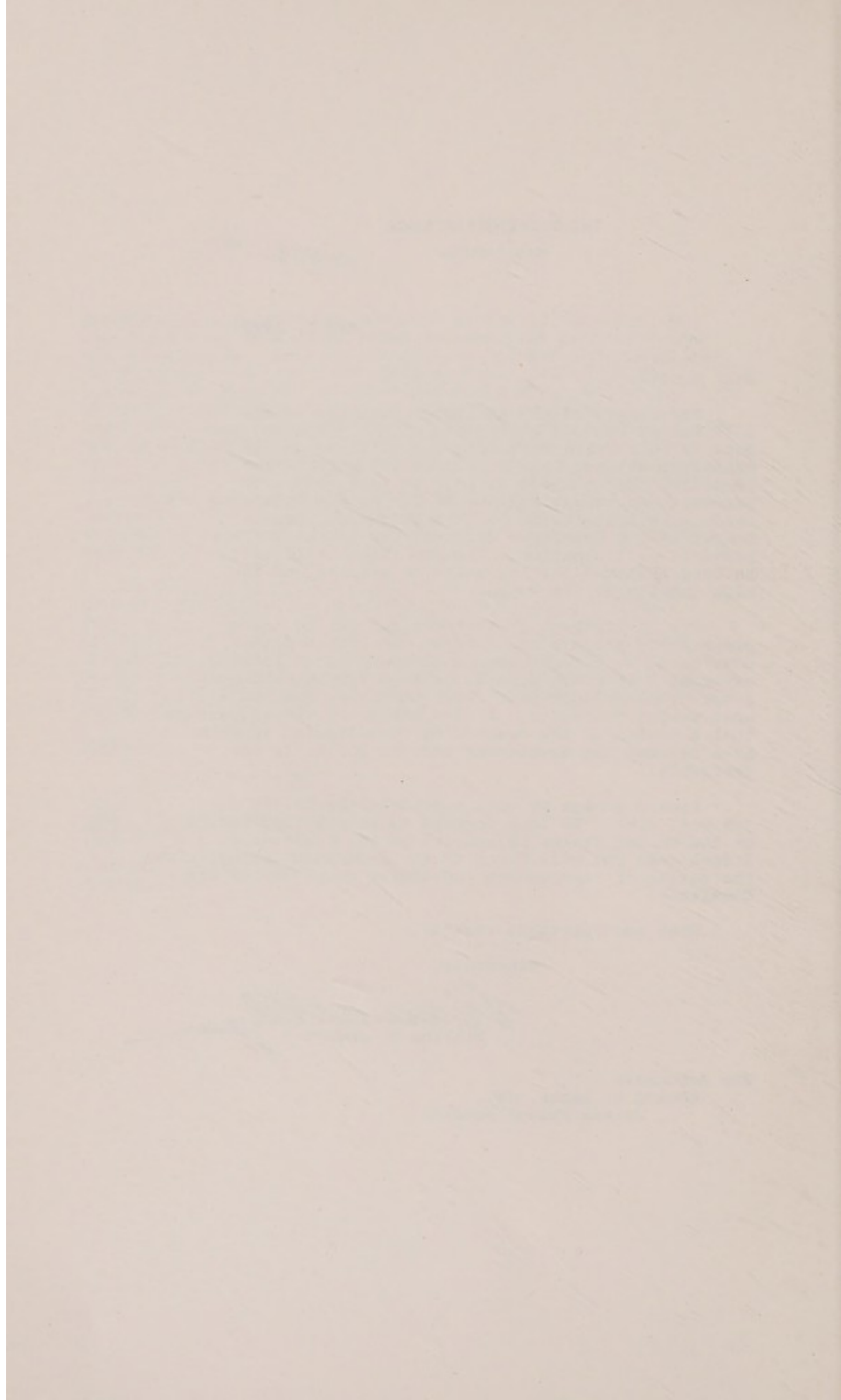
Please accept my most heartfelt thanks for a job well done. We look forward to your participation on the United States Delegation to the Conference, and I feel sure you will bring to the Stockholm deliberations the wealth of information and advice developed by the Committee.

With best personal regards,

Sincerely,


William P. Rogers

The Honorable
Howard H. Baker, Jr.,
United States Senate.



CONTENTS

	Page
Summary and Recommendations	1
Agenda Items	
1. Human Settlements	5
Planning and Management of Human Settlements for Environmental Quality	
2. Resource Management	27
Environmental Aspects of Natural Resource Management	
3. Pollutants	76
Identification and Control of Pollutants and Nuisances of Broad International Significance	
4. Education	94
Educational, Informational, Social, and Cultural Aspects of Environmental Problems	
5. Development	116
Development and the Environment	
6. Institutional Arrangements	129
Institutional Arrangements and the Declaration on the Human Environment	
Appendix—List of Witnesses	146

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SUMMARY AND RECOMMENDATIONS

Stockholm is the world community's first comprehensive attempt to respond to the awesome global environmental degradation we face. This challenge, like most that modern man has confronted, has caught us almost totally unaware. Just as wars have found us ill-equipped to cope with development of new methods of mass destruction, modern technology, the darling of Western civilization, is now under increasing attack for its detrimental side-effects on the environment. Computer simulations predict a rapid decline in the world's standard of living, if not an end to human existence as we know it. Energy demands rise while the world's finite resources approach exhaustion—some within our lifetime. Pollution threatens to make the common resources—air, water and land—unusable for future generations. These newly recognized crises compound the suffering of two-thirds of the world's population condemned to poverty, inadequate housing, disease, and malnutrition.

While these problems are viewed as almost insurmountable by many, we do not share their pessimism. We are encouraged by the actions of the United States and the world community in preparation for the Stockholm Conference. We believe that these actions evidence a growing change in values and priorities—indeed a change in our perception of ourselves in relation to the global environment.

We must see ourselves not only as victims of environmental degradation but as environmental aggressors and change our patterns of consumption and production accordingly.

We must accept the responsibility of stewardship for the resources of the earth.

We must channel the growth of technology to produce not further environmental problems but new solutions.

We must help end the deprivation of peoples in the world.

Those of us in the developed world should set an example by putting our own environmental house in order while learning from others

that different patterns of growth from ours may improve the quality of life without environmental degradation.

Finally, it is most critical that we back these resolves by actions in the United Nations and nationally which transcend political, cultural and social differences among persons and nations.

As the first major step toward these goals, over 130 nations will meet in Stockholm on June 5, 1972, to convene the United Nations Conference on Human Environment. The recognition by all nations, regardless of stage of development or form of government—that man's survival ultimately depends on each nation's acceptance of responsibility for the global environment—will be the most significant aspect of this Conference.

In setting a broad prospectus for action, as opposed to more rhetoric, Maurice Strong, the Secretary-General of the Conference, has made numerous recommendations for action at Stockholm, most of which the Secretary's Advisory Committee supports. In addition to our responses to these recommendations, we suggest various paths of action—for Stockholm and beyond—on the social, cultural, political, and economic aspects of the environmental crisis. The Committee recommends as matters for special attention :

1. That the United States do all it can to assure that there be universal and full participation of nations in the Stockholm Conference and the actions that flow from it. The environmental crisis is universal and should elicit a universal response. It would be most regrettable if all nations, especially the industrialized nations of the Socialist bloc, do not attend due to political issues (chapter VI, Advisory Committee Recommendation 7.) ;

2. That the environmental ethic which underlies the proposed Declaration on the Human Environment be adopted in clear and strong terms as a first priority. Recognition and acceptance of an environmental ethic to serve as a guide to national and international actions will be a major thrust of the entire Conference on the Human Environment. All participating nations must accept their responsibility to refrain from actions detrimental to the environment and to support actions that will restore and maintain the environment ;

3. That a strong, high-level environmental office in the United Nations be created together with a United Nations Intergovernmental Body which will be a subsidiary of the General Assembly (chapter VI, Advisory Committee Recommendation 1; chapter III, Recommendation 1) ;

4. That a United Nations Voluntary Fund for the Environment be created with a minimum annual budget of \$100 million to be derived from contributions of member states based on an energy consumption formula (chapter VI, Advisory Committee Recommendation 2) ;

5. That a Division of Human Settlements be created under the Intergovernmental Body for the Environment to operate on a minimum annual budget of \$50 million (chapter I, Advisory Committee Recommendations 1 and 2) ;

6. That methods be developed to resolve conflicts between nation-states on issues of environmental degradation (chapter VI, Advisory Committee Recommendation 8) ;

7. That international environmental impact statements be made and filed with the United Nations Environmental Office by nations, international development agencies, and multinational corporations (chapter VI, Advisory Committee Recommendation 6; chapter V, Advisory Committee Recommendation 1) ;

8. That a United Nations Report on the State of the World Environment be prepared periodically and issued by the Secretary-General of the United Nations (chapter 6, Advisory Committee Recommendation 1, chapter III, Advisory Committee Recommendation 3) ;

9. That a global monitoring and surveillance network be developed to provide current information on the spread of pollution and the utilization of natural resources (chapter III, Advisory Committee Recommendation 1A) ;

10. That a standard-setting capability be established in the United Nations environmental office (chapter III, Advisory Committee Recommendation 1F) ;

11. That all developed nations strive to meet the foreign assistance goal of 1 percent of GNP and that, in addition, bilateral and multilateral development aid be increased to include the costs of incorporating environmentally sound processes and products in the efforts to raise the standard of living for peoples of the world (chapter V, Advisory Committee Recommendation 4) ;

12. That an international effort be undertaken to assist all nations in evaluating the impact of population and its growth on the quality of human life, spreading knowledge of present population control methods, and sponsoring research into new methods. We do not recommend any particular population policy. Rather, we propose the goal of an informed free choice by the nations of the world (chapter I, Advisory Committee Recommendation IB3) ;

13. That a Governmental system be established to regulate consumption of national nonrenewable resources and a similar mechanism applicable to natural resources under international jurisdiction be considered (chapter II, Advisory Committee Recommendation 1);

14. That interdisciplinary scientific advice regarding the environment be institutionalized on an international basis (chapter VI, Advisory Committee Recommendation 1).

1. Human Settlements

Planning and Management of Human Settlements for Environmental Quality

INTRODUCTION

Mankind is moving rapidly to the realization that the concept of the human environment must be based on the recognition that the world is a whole, of which man is an integral part, and must include not only the physical world around us but our shelters, our communities, and our total sense of well-being. Where and how we live, how we provide the necessities and the amenities of life, indeed, how we relate to each other and govern our actions—these are all aspects of the human environment. Each of them, we now realize, must be specifically evaluated in terms of its contribution to the individual's opportunity for self-fulfillment.

Creating the conditions for human development has often meant interference with the "natural order" and, in many cases, outright destruction of parts of it. In particular, the construction of human settlements has involved innumerable intrusions upon the natural order, some of which have been "beneficial" to nature, some "detrimental". Thus, agriculture required the uprooting of trees and grassland so that man could plant and grow "alien" foods. Not only for the sake of food but for basic survival and increased well-being man has killed off many species. We propose, however, that human settlements be viewed as aspects of the natural environment and its ongoing ecological systems. Necessary for man's survival and development, they become part of the ecosystem. Our concern should be not how to prevent human settlements from infringing upon the natural order, but rather how human settlements can enhance the total environment.

We believe there can be ecologically sound human settlements, within which man can live decently and in ways which will enhance the beauty and harmony of the world. To develop such settlements, we must understand the complexity of the processes involved. An ecologically sound process must deal not only with pollution, but physical and mental health, the conservation of resources (including aesthetically interesting and pleasing vistas), the transportation of people and the communication of ideas, and a host of other social, cultural, economic, and political issues. For example, we must find ways to encourage the continued growth of distinct, organic cultural communities. We must continuously attempt to improve socioeconomic systems that deny the basic equality of all persons or that permit oppression and exploitation. We must develop political arrangements that give the individual the opportunity to exercise greater control over his own destiny. All of these can contribute to the development of ecologically sound human settlements.

Cities have been called the greatest achievement of mankind, indeed the flowering of our civilization. They are the centers of knowledge and have nourished the arts from the earliest times. For the developing nations, the cities often serve not only as cultural centers, but also as the arenas in which the sense of nationality and peoplehood is best expressed. Yet, throughout the world, the rapid growth of urbanization is a serious and fundamental problem. In nation after nation, rural people are leaving the countryside to seek a new and hopefully better life in the cities, both new and old. Unfortunately, the life awaiting them, though better in ways than their previous life, often is not conducive to sound human development. Adding to the potential for misery in the cities is the high birth rate which increases the already overloaded demand for food and shelter.

An open-minded approach and considerable research will be required to ascertain which political, social, or economic factors have been responsible for this process of human agglomeration. The mechanization of agriculture in many nations has forced the farmer off his land and into the cities. Other recent large-scale migrations of people, who have become "refugee" populations, may have resulted less from the workings of the laws of economics than from racial hatreds and the pursuit of war and power politics.

We believe that the improvement of human settlements, including cities, is an absolute prerequisite for creating the conditions conducive to human development. The cities, in particular, are, and historically have been, the locus of man's intellectual and cultural development. The development of cities should be seen as a part of, and a requirement for, total national development, both of which should proceed in full awareness of the total environment.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE

A. Recommendations—International

1. A Division of Human Settlements should be created under the jurisdiction of the United Nations Intergovernmental Body for the Environment.¹ This Division will report to the Intergovernmental Body and would be available to the Environmental Executive² for advice, consultations, and special projects. Like other United Nations agencies and groups, the Division would be subject to guidance by the environmental executive. It is further recommended that the Economic and Social Council (ECOSOC) Centre on Housing, Building, and Planning be absorbed into this Division.

2. The Division of Human Settlements should as its principal functions:

(a) Coordinate efforts to inform the nations of the world about the problems of the uncontrolled growth of population and the methods available for assisting in its control. It will also coordinate and sponsor efforts to develop better and safer methods of contraception; in cooperation with other international agencies concerned with population control, it should assist all nations, including the developed ones, in evaluating the impact of population growth on the quality of life.

(b) Represent, within the United Nations and the international community, the interests of man in terms of his need for adequate shelter in viable communities where he will have the maximum opportunity to develop his unique potential.

(c) Coordinate the work of the various governmental and non-governmental international agencies dealing with the issues of human settlements, viewing itself as a catalyst and promoter, but not a large-scale operator of programs.

(d) Provide assistance to all nations in the area of human settlements through:

(1) Technical assistance:

(i) The Division should support existing research and start new inquiries on questions of technology, finance, governance, industrial development, and pollution as they relate to human settlements, and it should ensure wide-spread publication of the findings.

(ii) The Division should assist in the establishment of regional

¹ See Chapter VI, Advisory Committee Recommendation 6.

² See Chapter VI, Advisory Committee Recommendation 1.

training centers, such as the Nagaya Center in Japan, and where necessary, provide the funds for their operation.³

(iii) The Division should help in the provision of specific professional and technical advice on environmental questions.

(2) Financial assistance: The Division should use some of its funds to assist in developing local and regional institutions and organizations that seek capital resources to improve human settlements. It should also work to create a system that would provide for international capital investment in housing for the developing nations.

3. No less than \$50 million annually, for the first 5 years, and, thereafter, at least \$100 million annually, of the United Nations Environmental Fund should be assigned to the Division of Human Settlements.

4. All development assistance agencies, whether international (such as the United Nations Development Program (UNDP) or International Bank for Reconstruction and Development (IBRD)) regional, or national, should include the total infrastructure costs of human settlements as part of economic or industrial development loans or grants.⁴

5. The nations of the world should recognize their moral obligations to assist in the resettlement of persons displaced by their actions, including military operations and political changes.

6. The United Nations Declaration on Human Rights should be amended to include a provision that each individual has a right to a decent home in a suitable living environment.

7. An international program should be undertaken to develop transportation systems that are in harmony with the goal of ecologically sound human settlements; planning for transportation systems should be a major part of a "comprehensive planning approach" which is essential for the development of sound human settlements.

B. Recommendations—National

1. Nations should recognize that the human environment includes the locus of the individual's activity, his opportunity for self-development, and the sense of his well-being.⁵

³ It is recommended that (d) be added to Recommendation 135 of the Report by the Secretary-General of the United Nations Conference on the Human Environment on the "Planning and Management of Human Settlements for Environmental Quality" ((A/CONF. 48/6, Dec. 23, 1971)). The Report appears at the end of this chapter with the Advisory Committee responses.

⁴ It is recommended that this be added to Recommendation 136 of the United Nations Report on "Human Settlements for Environmental Quality."

⁵ It is recommended that this be added to Recommendation 134(a) of the United Nations Report on "Human Settlements for Environmental Quality."

2. Nations should recognize that an ecologically sound system necessitates an equitable socioeconomic structure.⁶

3. National population policies should recognize that population growth and distribution are affected by changes in the socioeconomic and cultural structures of the society.⁷

4. Settlements in which economic growth is not the prime focus of development should be encouraged.⁸

5. Policies should be developed and implemented on the local and regional levels, that will ensure the public's ability to recapture the appreciated value of land resulting from development.⁹

6. A goal of environmental development should be organic communities growing out of the active participation of the citizens in the planning and implementation processes. One way to achieve this goal is through the use of neighborhood units as the urban building blocks.¹⁰

DISCUSSION OF THE ADVISORY COMMITTEE RECOMMENDATIONS

A. Recommendations—International

1. *Division of Human Settlements*

For a number of years there have been proposals to establish an International Agency for Urban Development and Housing which would coordinate international action in the housing and community development fields. The only response to these proposals occurred 10 years ago with the establishment within ECOSOC of the Centre for Housing, Building, and Planning. It has languished, however, for lack of funds and adequate staff. While other international agencies have units concerned with urbanization, there is no group at a high enough level to provide effective coordination or undertake meaningful new programs. The need for such an organization has grown at the same disturbing rate as has urbanization in the developing nations.

The creation of an Intergovernmental Body for the Environment provides a unique opportunity to deal with the needs of the world's slums, squatter sites, refugee camps, and new urban centers. Rather

⁶ It is recommended that this be added to Recommendation 134(a), 140, 145 of the United Nations Report on "Human Settlements for Environmental Quality."

⁷ It is recommended that this be added to Recommendation 134(c) of the United Nations Report on "Human Settlements for Environmental Quality."

⁸ It is recommended that this be added to Recommendation 134(f) of the United Nations Report on "Human Settlements for Environmental Quality."

⁹ It is recommended that this be added to Recommendation 134(h) of the United Nations Report on "Human Settlements for Environmental Quality."

¹⁰ It is recommended that this be added to Recommendation 134(k) of the United Nations Report on "Human Settlements for Environmental Quality."

than being shunted off to a low-level office in the ECOSOC bureaucracy, these matters can be made a central part of the operations of the high-level Intergovernmental Body. They belong there because the problems of human settlements are the vital core of the entire human environmental crisis. To exclude them would be to deprive the Intergovernmental Body of the very significant human factor so relevant to environmental concerns. Conversely, those concerned with human settlements would be mistaken to view their problems apart from the total environmental context. The solution is clearly to establish, within the Intergovernmental Body, a high-level Division concerned with the problems of human settlements. The present staff of the Centre would provide a good core for the technical section of the Division.

The proposed Division should place emphasis on providing technical assistance, stimulating and coordinating international planning and community development, and ensuring that financial aid will be available. Above all, the Advisory Committee recognizes that each nation's problems can be solved only on the local level through local effort, but that, there is, at the same time, a need for various kinds of assistance.

2. Functions of the Division of Human Settlements

The primary functions of the proposed Division of Human Settlements would be coordination, research, training, and technical assistance in the human settlements field. The programs needed range from those dealing with the most immediate of problems, such as providing shelter and sanitary facilities for thousands of refugees and migrants, to the long-range needs for new methods of construction, transportation, communications, and waste removal. In some cases, the simple transfer of existing knowledge and low-level technology are required, while in others, the expansion of knowledge and development of complex technology are necessary.

Where programs dealing with the problems are now underway or are likely to be undertaken by an existing agency, the Division would act as a coordinator and disseminator of information. However, in the areas where such work has not been done and does not fall within the purview of existing bodies, the Division would initiate new programs and, in some cases, operate them. In all cases, location within the Intergovernmental Body, would give the research of the Division a fully environmental orientation.

Training stands out as most important because of our commitment to the principle that the peoples of the world should decide their own destinies. The Division would not dictate to nations but would assist them in understanding the problems and evaluating the various available techniques to deal with them. Providing such information and helping people make use of it should be carried out as close to the field

of operation as possible. The optimum situation would be training centers and on-site technical assistance; the next best would be the regional training centers, once approved by the United Nations but never fully established. The Division would assist in their establishment and provide funds where necessary, although each center should operate autonomously.

The Advisory Committee recommends the expenditure of limited grant funds to serve as "seed money" on the local level. Many developing nations lack the institutional structures that would allow them to accumulate the capital needed for large-scale development. The formation of such structures and financial systems can be aided by an infusion of practical know-how and small-scale initial funds.

Not proposing any massive capital expenditure program is not only pragmatic but also responsible. Each country must look to its own resources for its primary push toward development. We recommend that the development of housing and communities be viewed not as a financial burden but as an economic opportunity to multiply the effect of capital investments. For example, wealthy land-owners might be urged to convert their lands into liquid capital, which could then be invested in the local market. In addition, if the proper institutions are created and the economic opportunity is provided, then foreign investment of capital is a distinct possibility. However, to guide its own destiny, each nation ultimately must rely upon its own resources.

Population growth is a matter of the greatest importance in discussions of human settlements and the environment. The minimal recommendation which we make is to undertake studies of the impact of population growth, to develop new means of contraception, and to disseminate all available information to as many persons as possible. Once again, each nation must decide what its own population policy ought to be and how to implement it, i.e., by inducements or by sanctions, and how much free choice should be granted individuals. The Division should help nations identify the relationship between various rates of population growth, the quality of life for all, and the values of ecologically sound development. It ought to help in the preparation of world-wide studies of population growth impact. Through these functions, it should ensure that freedom of choice is informed choice.

3. The Human Settlements Fund

The recommendation of a relatively small United Nations Voluntary Fund for the Environment and a similarly limited budget for the Division of Human Settlements reflect the realization that the development of both adequate administration and worthwhile programs takes time. In addition, of course, no fund of this size can be expected to deal with the capital needs of any full-scale undertaking.

The direction of fund monies will be into the areas of technical assistance, training, and research.

4. Development Assistance Agencies Include Settlement Costs

Providing for the infrastructure costs of new settlements as a part of a total development plan is probably the best way to assist in their development. Too often, nations opt for the simple, quick route of constructing manufacturing plants while neglecting to consider the human settlements aspects of rapid industrialization. In the past, the international development assistance agencies have reinforced this shortsightedness through their own lending policies. Our proposal looks toward a correction of this myopia.

5. Refugee Resettlement

Within the past decade, millions of refugees have been created by the military and political actions of many nations. The immediate care and long-range resettlement of these persons are among the greatest human problems on the international scene; the destructive effect on the environment, on both the people and the land, has been enormous. So long as the nations of the world must persist in their ritual of war and destruction, they must come to accept the resettling of the refugees as part of the cost of war.

6. Declaration on Human Rights

Recognition of the fundamental right of man to a decent home in a suitable living environment should move the nations of the world to work toward this goal. The fulfillment of man's capabilities as a physical, intellectual and moral being requires a decent home or context within which to live and grow.

7. Transportation

In the developed nations, the automobile has contributed significantly to the welfare and pleasure of millions of people. It has become one of the most sought-after consumer items of all times. Unfortunately, however, it is also a major source of air pollution, and the highways built for it have caused extensive environmental damage. Dependence on the auto has also caused massive traffic problems and degraded the quality of urban life. The automobile manufacturers, who are mainly located in the United States, Italy, Germany, France, Great Britain, and Japan have reaped large profits from the sale of vehicles all over the world. It seems equitable, therefore, that these nations assume responsibility for developing a pollution-free auto and for developing other modes of transportation equally ingenious but more ecologically sound and efficient than the present automobile.

B. Recommendations—National

In preparation for proposal of actions to be taken by ourselves and other nations, individually and collectively, we must examine the American experience with human settlements. The "frontiersman" concept provides a useful vehicle for seeing both the positive and negative aspects of the past and present. It conjures up images of strong, free individuals setting forth to seek a new life on the apparently limitless lands of the frontier. The conquest of natural elements and, where necessary, human ones was viewed as the ultimate challenge to man; of course, on a more practical level it was viewed as the only way to survive, let alone, prosper. While individual freedoms, social mobility, and material abundance for some people did result, so did other facts which cannot be neglected. The "limitless" natural resources, in particular, the land itself, were often despoiled and depleted; many persons were subjected to economic and cultural oppression; and the qualitative aspects of human existence were often discounted in favor of the quantifiable ones.

Regardless of the initial values of the "frontiersman" approach it increasingly became a problem as the resources diminished, the population grew and the industrial age asserted itself. To some extent the cities which have grown up in America, unlike the older cities of Europe, reflect either the organic human scale of the Feudal period nor the grace and beauty of the Renaissance and Empire periods, but rather the model of the industrial machine. Essentially, our cities are like machines: they were built for the productive process and have become more machine-like as the processes were refined.

Feeding this type of development has been a lack of public planning, the prevalence of private land speculation, and the influence of special interests. The lack of public planning of the use of land has led to massive public expenditures that have benefited the few at the cost to the many. The role of special interests as well as the lack of public planning have resulted in the location of businesses and, subsequently, larger settlements in areas where the carrying capacity of the air and water have since been seriously taxed. Had the environmental impact been anticipated, much damage could have been avoided.

Another major phenomenon of the American development process has been the heavy emphasis on economic concerns—a fact which has been made manifest in many of our human settlements. For example, while major attention was directed at the construction of industrial plants all too often inadequate resources were channeled into the construction of decent homes for the workers. Due to the drive for economic efficiency and greater food production, huge agricultural

combines developed but, unfortunately, in only few instances did the individual small farmer and his family benefit. The industrial growth of the cities created wealth and vast employment opportunities but did not always provide the new residents with the opportunity to live in a decent environment. Many of our nations' minority groups have experienced the full impact of the process. The clearest example of the conflict between the national concern with economic growth and other human values has been in our relations with the American Indian nations; their cultural values of respect for all living creatures, the inherent holiness of the land, and the non-acquisition of material goods were seldom considered when they stood in the path of economic development.

As Americans, however, we can be proud of much of our national development, not only of our obvious material wealth but of our respect for freedom and participation, both of which have been adhered to for the most part. Americans have been committed to the ideal that all individuals should have freedom of choice in all areas of life and the concomitant ideal that everyone should be able to participate in public decisionmaking.

Thus, much of what we disparagingly call the "ticky-tacky" parts of suburbia grew out of the postwar demands of the American citizen-consumer; though it was often praised by the professional planners of those days. In recent years, refinements in public decisionmaking have led to the concept of neighborhood-citizen participation in the city-planning process. These approaches inspire hope. The challenge is to continue to strengthen processes that reflect a dynamic interplay between the demands of professional planning, ecological awareness, and individual free choice. Perhaps we should conclude that as Americans we still hold to the vision of a just society for all and trust that our future will manifest it more fully than our past.

1. The Human Environment

Comprehensive environmental development must include not only man's physical habitat but also the opportunity for self-development and the achievement of a sense of well-being. Man strives toward fulfillment and perfection while also seeking immediate comfort and security. Proper planning and implementation processes must take these characteristics into consideration.

2. Socioeconomic Change

The socioeconomic structure affects every person's health, sense of well-being, and ultimate ability to control his destiny. Aside from the obvious fact of the least fortunate suffering most from physical environmental degradation, there are psychic realities of alienation,

anomie, meaninglessness and powerlessness. These factors, which often result from the inequities of our system, produce not only physical and mental health problems but also the culture of poverty, the antithesis of a healthy environment. Merely improving the physical structure and surroundings will not produce an adequate environment for the full development of all persons; the socioeconomic structures must be altered as well.

3. Population Policies

The rate of population growth is a function of social, economic, and cultural factors as well as of governmental policies. In the 20th century, increases in wealth, social status, and urbanization have led to reduced birth rates, so that one may surmise that further beneficial movement in those directions in the nations of the world will result in still further drops in the rates. In addition, as children become less of a financial boon, either as cheap labor or as security for old age, and, as the comforts of present-day living increase, the cultural attitudes toward the size of families seem to be modifying. Finally, in many cases the number of children produced is related to cultural mores based on social status and societal limitations on individual opportunity. Therefore, changes in the areas mentioned above are probably of greater importance than a consciously established population growth policy.

4. Regional Growth Poles

The doctrine of the inevitability of economic growth ought not to be uncritically accepted by national policymakers. Often this "inevitability" results more from policy decisions and programs that impel people to move in certain directions rather than from the natural movement of people. In the United States, at least, there is a growing challenge to the concept of unending economic growth and a movement toward an improvement in the quality of human experience. Governments ought to sympathetically consider the encouragement of "centers" given to other than economic concepts of "growth." Modification in the tax structure, both local and national, to encourage smaller scale, ecologically sound developments would be an effective supplement to direct Government action.

5. Land Use Controls

The most important natural resource, from the human settlements perspective, is the land. Unless its use can be controlled by the public, there is no way in which comprehensive planning can be made feasible. The evils of private land speculation and uncontrolled private development have produced, in this and other countries, the environ-

mentally poor settlements that now sprawl over the countryside. In the developing nations, land speculation continues at extremely high levels, so that the cost of land greatly inhibits the development of needed shelter at reasonable prices; the cost of land is often 60 percent of the total development cost in these nations. Moreover, under the existing system, the private landholders derive large benefits from public investment in the infrastructure of the community, including the appreciation in value.

Therefore, the solution required is some form of public control over land use and public recapture of land appreciation resulting from public investments. Among the means of accomplishing these goals are public ownership of all land, a public land bank, enforced land use plans, taxation and other incentive policies, and eminent domain. In adopting a particular approach for its area, each government ought, however, to consider, within the overall value of planning, the value of individual and community free choice. Finally, planners and public officials should be wary of developing a "tyranny of the public interest." Individual "private interests" can always "rationally" be outweighed by the public interest, and a lack of personal freedom may result from such "rational" balancing.

RESPONSE TO U.N. RECOMMENDATIONS

Response of the Advisory Committee to the Recommendations of the Report by the Secretary-General of the U.N. Conference on Human Environment on the "Planning and Management of Human Settlements for Environmental Quality" (A/CONF. 48/6, 23 December 1971).

A. Recommendations for National Action

132. Direct action aimed at improving the environmental quality of human settlements must clearly be undertaken at the national level, with each country pursuing policies appropriate to its particular conditions (availability of financial and other resources, political, institutional, social and cultural framework).

Response: 132. The Advisory Committee concurs.

133. The foregoing sections of this paper (i.e., the United Nations Secretariat preparatory paper) contained a number of proposals designed to ease the problems of human settlements. *These proposals are commended to national governments for their consideration.*

134. In addition, *it is recommended that the attention of governments be drawn to the need for action in the following priority areas:*

134(a). The adoption of a *comprehensive environmental development* approach to policy-making and implementation in the field of human settlements;

Response: 134(a). See additional comments in chapter 1. Advisory Committee Recommendations B 1. and 2.

134(b). the improvement of existing—or the establishment of new—*legislative and institutional frameworks* to render such an approach effective ;

Response: 134(b). The Advisory Committee concurs.

134(c). the launching or further development of *national population policies* dealing with the growth and distribution of population in relation to the role, location and size of human settlements and in keeping with a rational use of resources ;

Response: 134(c). See additional comments in chapter 1. Advisory Committee Recommendation B.3.

134(d). The assessment of urban and rural *water supply and sanitation*¹¹ problems ; the adoption and implementation of national policies to solve these problems ; and the setting—and inclusion in national development plans—of specific annual targets designed to meet the objectives of the WHO water supply and sanitation programme for the United Nations Second Development Decade ; and the creation of the necessary institutions and the training of skilled manpower for the planning and management of water supply and sanitation system ;

Response: 134(d). The Advisory Committee concurs ; often dramatic progress can be made in the improvement of environmental conditions by very limited expenditures of time, money and effort—this is such an area.

134(e). The allocation of greater financial and other resources to the *housing* sector so as to preserve what is valuable in the existing housing stock ; launch, what ever possible, public housing projects ; revitalize city centres ; improve transitional settlements ; promote mutual help and aided self-help ; and provide, where appropriate “site and service” facilities to new migrants ;

Response: 134(e). The Advisory Committee concurs ; however, emphasis should be placed on units that are susceptible of “self-design” and “self-help” in construction ; moreover, the use of materials and methods indigenous to a locality are recommended.

134(f). The establishment of regional and sub-regional *growth poles* in order to revive and preserve rural settlements and to reduce mass migration to large urban centres ;

Response: 134(f). See additional comments in chapter 1. Advisory Committee Recommendation B.4.

134(g). The development of appropriate *mass media channels* to strengthen the capacity of growth poles to revive and preserve rural settlements through vocational and motivational communications ;

Response: 134(g). The Advisory Committee concurs. This is a particularly important area where technological breakthroughs could obviate the need to increase aggregations of people for industrial purposes.

¹¹ See also U.N. Report on “Environmental Aspects of Natural Resources Management” (A/CONF.48/7).

134(h). The adoption and implementation of a dynamic *policy of land use* through appropriate incentives and controls designed to prevent land speculation, ensure the proper location of industries, provide security of tenure in transitional areas and restrict motor vehicle traffic;

Response: 134(h). See additional comments in chapter 1. Advisory Committee Recommendation B.5.

134(i). Improving human environment; specifically, the development of city and intercity transport systems for environmental quality and the solution, by technical, legislative and administrative measures, of existing problems of traffic congestion and safety and of air, water and noise pollution from transport sources;

Response: 134(i). The Advisory Committee concurs.

134(j). The provision of *educational and recreational facilities* for youth of the poorer urban and rural areas;

Response: 134(j). The Advisory Committee concurs. However, a provision for cultural facilities that promote diversity and pluralism should be included.

134(k). The mobilization of *public support* for the comprehensive environmental development of human settlements and to achieve the highest possible degree of *public participation* in formulating and implementing policies.

Response: 134(k). See additional comments in chapter 1. Advisory Committee Recommendation B.6.

B. Recommendations for International Action

135. The recommendations listed below are designed: (a) to support action at the national level through the establishment of services and facilities which could be made available to governments on request or (b) to help solve problems whose scope clearly transcends national borders.

Response: 135. See additional comments in chapter 1. Advisory Committee Recommendation A.2(d).

(i) Recommendations to Development Assistance Agencies

136. It is recommended that:

- all development assistance agencies, whether international, such as UNDP and IBRD, regional or national, give high priority to responding to requests of governments for assistance in the field of human settlements, notably in housing, transportation, water and sewage problems, the mobilization of material human and financial resources and the improvement of transitional urban settlements;
- these agencies also be prepared to assist the less-industrialized countries to take account of the environmental problems of development projects; to this end, they should recruit appropriate environmental staff.

Response: 136. See additional comments in chapter 1. Advisory Committee Recommendation A.4.

(ii) *International programme for "Environmental improvement areas"*

137. It is recommended that:

— governments designate to the Secretary-General areas in which they have committed themselves (or are prepared to commit themselves) to a long-term programme of environmental improvement.

— countries concerned would presumably charge an appropriate body with planning and supervising the implementation of such a programme for areas which could vary in size from a city block to a national region.

— countries which are prepared to launch such a program of environment improvement should be prepared to:

- make long-term commitments of financial and other resources;
- welcome international co-operation through seeking the advice or assistance of competent international bodies;
- share internationally all relevant information on the problems they encounter and the solutions they devise in developing these areas.

Response: 137. The Advisory Committee feels that this recommendation lacks meaningful substance.

(iii) *Bilateral and regional consultations*

138. Certain aspects of human settlements can carry international implications, e.g., "export" of pollution from urban and industrial areas, 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.

Response: 138. In order to make this proposal meaningful, the development of Conventions establishing an international cause of action and access to national tribunals is needed.

(iv) *Research*

139. The review of issues and problems contained in this paper has disclosed a great many areas where additional knowledge is needed which can only be obtained through new research directed at its application. (It should be emphasized, however, that research should not be viewed as a precondition for national action but as a means of supporting and furthering such action.)

140. Accordingly, *it is recommended that* Governments and the Secretary-General, the latter in consultation with the appropriate United Nations agencies, take the following steps:

—entrust the overall responsibility for co-ordinating environmental research to any central body that may be given the co-ordinating authority in the field of the environment;¹²

—identify, wherever possible, an existing agency within the United Nations system as the principal focal point for initiating and co-ordinating research

¹² See also United Nations Report on "International Organizational Implications of Action Proposals" (A/CONF.48/1).

in each principal area and, where there are competing claims, establish appropriate priorities;

—designate the following as priority areas for research:

- theories, policies and methods of comprehensive environmental development
- water supply, sewage and waste disposal, particularly in semi-tropical and tropical regions—(principal responsible agency: WHO)
- problems of transitional settlements including socio-economic factors of rural-urban migrations—(principal responsible bodies: ESA (CHBP), WHO, ILO)
- environmental socio-economic indicators to measure the condition of human settlements and to identify, over time, trends in their development¹³
- alternative methods of getting urban transportation needs—(principal responsible bodies: ESA (Resources and Transport Division) and CHBP)
- psycho-social stresses in urban conglomerates (principal responsible agency: WHO)

Response: 140. See additional comments in chapter 1. Advisory Committee Recommendation B.2.

141. *It is further recommended that Governments consider co-operative arrangements to undertake the necessary research whenever the above 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.*

(v) Information exchange

142. The exchange of information involves a variety of techniques including the use of existing centres, seminars, exchange of personnel, etc.¹⁴

143. Although most research is likely to be carried out nationally, much of it will have international implications. The exchange of information covering the results of research and experimentation constitutes one of the most important means of assisting countries in the planning and management of their human settlements. Experience has shown that information exchange can best be carried out through people not papers.

144. Accordingly, *it is recommended 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;
- governments and the Secretary-General ensure that 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, be accelerated.

Response: 141–144. Fewer transoceanic flights, and more hard thinking and careful experimentation, would seem to be in order.

¹³ This research area is covered in subject area IV, U.N. Report, "Educational, Informational, Social, and Cultural Aspects of Environmental Issues" (A/CONF.48/9).

¹⁴ The overall subject of information exchange is covered in greater detail in subject area IV (A/CONF.48/9).

(vi) Training

145. The shortage of trained personnel is one of the major constraints on the ability of the international community to implement the other recommendations contained in this paper. There is a world-wide scarcity of people capable of providing training in the skills needed to deal with interdisciplinary systems of interacting activities. Although such training is urgently required, few existing institutions are in a position to give it.

Response: 145. See additional comments in chapter 1. Advisory Committee Recommendation B.2.

146. *It is recommended that:*

Governments and the Secretary-General give training of "integrators".

147. Shortages of skilled personnel also exist in particular sectors of human settlements. Training in these areas could be provided by international, regional or national training institutions.

148. *To this end, it is recommended that:*

Governments and the Secretary-General ensure that the institutions concerned be strengthened and that special training activities be established for the benefit of the less-industrialized countries, covering the following:

- intermediate and auxiliary personnel for national public services who, in turn, would be in a position to train others for similar tasks—(principal responsible bodies: WHO, ESA (CHBP), UNIDO, FAO)
- specialists in environmental planning and in rural development—(principal responsible bodies: ESA (CHBP), FAO)
- community developers for self-help programmes for low-income groups—(principal responsible body: ESA (CHBP))
- specialists in working environments—(principal responsible bodies: ILO, ESA (CHBP), WHO)
- planners and organizers of mass transport systems and services with special reference to environmental development—(principal responsible body: ESA—Resources and Transport Division).

149. *It is further recommended that:*

Regional institutions take stock of the requirements of their regions for various environmental skills and of the facilities available to meet these requirements in order to facilitate the provision of appropriate training within regions.

Response: 146–149. The Advisory Committee concurs.

(vii) Programme to reduce losses from natural disasters

150. In contrast to the other subjects covered in this paper, natural disasters pose the environmental problem of *protecting man from nature*. In view of the importance and complexity of the subject and of its national, regional and global significance, a paper embodying a programme to reduce losses from natural disasters is annexed.

Response: 150. The Advisory Committee concurs.

(viii) Water supply

151. The shortages of adequate supplies of safe water, and of sanitary and sewer services from which most human settlements suffer, render action imperative in this area.

152. *It is recommended that WHO increase its efforts to support governments in planning for improving water supply and sewerage services through its community water supply programme.*

153. *It is recommended that development assistance agencies give higher priority to supporting governments in the financing and implementation of water supply and sewerage services as part of the objectives of the United Nations Second Development Decade.*

Response: 152-153. The Advisory Committee concurs.

(ix) Population

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

Response: 154. The Advisory Committee concurs.

ANNEX I

TO THE U.N. SECRETARIAT RECOMMENDATIONS

The Committee concurs on the following U.N. proposals on natural disasters. The proposals themselves follow.

1. Following a comprehensive report of the Secretary-General on assistance in cases of natural disaster¹ and as a result of Economic and Social Council resolution 1612 (LI) of 29 July 1971 and of General Assembly resolution 2816 (XXVI), the Secretary-General has been requested to appoint a Disaster Relief Coordinator heading a small permanent office in the United Nations. Accordingly, the recommendations which appear below embrace, in addition to proposals for national action, a broad framework which could guide the activities of the Disaster Relief Coordinator. No mention has been made, however, of the existing international machinery and co-operation during and after the occurrence of natural disasters which should in any case be strengthened.

¹ E/4994.

2. More specifically, these recommendations cover the following essential elements of a plan of action designed to reduce losses from natural disasters: (a) the intensive application of science and technology to the control and mitigation of natural disasters; (b) pre-disaster planning and preparedness.

A. Control and mitigation

3. The control and mitigation of natural disasters require the establishment of machinery for prediction, communication and prevention.

(i) Prediction and communication

(a) Recommendation for national action

4. *It is recommended that* the attention of governments concerned be drawn to the need for action to improve the ability to determine where disasters are likely to occur and to communicate the relevant information to those concerned. More specifically:

Improved knowledge of tectonics, seismicity and the earthquake mechanism could provide a scientific basis for predicting the time and location of single large *earthquakes*;

Expanded use of mathematical modelling and numerical analysis could improve knowledge of *tsunami* (seismic tidal wave) build-up;

A broad assessment is needed of the world *flood* problem. The primary need, especially in developing countries, is to define the regions which are most prone to flooding. Continued progress is required in developing models and techniques for gathering hydrological data;

Improvements are needed in the ability to predict the occurrence of *storms*, *typhoons* and *cyclones*;

Improvements are also needed in the ability to predict secondary disasters, such as major outbreaks of disease resulting from natural disasters.

(b) Recommendation for international action

5. *It is recommended that* the Secretary-General in consultation with the appropriate bodies of the UN system:

Study the desirability and the feasibility to implement an international disaster warning system which would utilize the most appropriate combinations of such networks as:

- a global surface observation network
- a global synoptic observation network
- a global aviation observation network
- a global upper air observation network
- a global river and flood measurement network
- a global radar observation network
- a global seismic and tide measurement network
- a global satellite observation network.

ensure that an international warning system for natural disasters, if implemented, is related, wherever possible, to systems designed to monitor and/or predict man-made hazards or disasters and, as appropriate, secondary disasters;

arrange, in the context of the eventual establishment of an international warning system, for the closest collaboration and co-operation between the competent agencies of the United Nations system, including:

- the World Meteorological Organization (WMO)

WMO's World Weather Watch Programme and its International Maritime forecasting and storm warning system, together with the artificial earth satellite, already provide the means for monitoring weather and climate on a truly global scale. WMO should take further action relating to river and flood measurement and forecasting, and should further develop its tropical cyclones project for the protection of populations exposed to cyclone risks.

- the United Nations Educational, Cultural and Scientific Organization (UNESCO)

UNESCO has stimulated the creation of international and regional seismological centres; further centres are needed.

- the World Health Organization (WHO)

WHO should take further action where major disease outbreaks resulting from disasters could arise.

Provide for co-operation and collaboration between the United Nations system and international and regional non-governmental organizations such as:

- the League of Red Cross Societies
- the International Tsunami Warning System

Establish an international disaster communications system. However accurate and effective warning systems may be, the warning has still to be communicated to those concerned. To this end, the Office of Disaster Relief should carry out the following activities:

- obtain information on, document, and evaluate all major natural disaster communications networks, including those operated by:

- governments
- the United Nations system
- the Red Cross Societies
- commercial organizations
- amateurs

- define the requirements of distributing warning alerts for each specific type of natural disaster, including warnings for impending:

- floods
- tsunamis
- earthquakes
- hurricanes
- volcanic eruptions

- define the requirements for rapid international communications and exchanges of critical, specialized information between offices responsible for preparing and issuing natural hazards warnings.

6. *It is further recommended that UNDP, which has already assisted many of the projects outlined earlier, give priority to responding within country programmes to requests of Governments for natural disaster research centres and warning systems.*

(ii) *Prevention*

7. Many of the worst effects of natural disasters can be mitigated if appropriate preventive measures are taken.

(a) Recommendations for national action

8. *It is recommended that* the attention of governments concerned be drawn to the need for action in the following areas:

the adoption of structural measures such as:

- the development of improved building methods and "house types" for low-cost, earthquake-resistant, storm-surge and wind resistant, rapid-construction housing
- flood control measures, such as detention reservoirs, levees, diversion channels, channel improvements, terracing, gully control, bank stabilization or revegetation, water shed management.

the adoption of non-structural measures such as:

- planning measures and land-use zoning designed to guide the settlements of human populations away from hazardous areas
- programmes of public information designed to show the nature of the hazard and of the required response

the adoption of a comprehensive approach to natural disaster The evaluation by planning ministries and national planning boards of the full range of possible actions, combining technical with social and economic measures. As an example, programmes of diversion, or evacuation without adequate provision for resettlement, may fail to achieve any genuine improvement in living conditions.

(b) Recommendations for international action

9. *It is recommended that* the Secretary-General ensure that the United Nations system provide to governments a comprehensive programme of advice and support in disaster prevention. More specifically: The question of disaster prevention should be seen as an integral part of the country programme as submitted to, and reviewed by, UNDP.

B. Pre-disaster preparedness

10. A plan for emergency action is essential in all disaster-prone countries and desirable in others.

(a) Recommendations for national action

11. *It is recommended that* the attention of governments concerned be drawn to the need for emergency action plans. These should specify:

organizational responsibilities: who is to take charge of what

- a role of armed forces or civil defence units
- role of voluntary agencies

lines of communication and command;

availability of emergency supplies;

type and amount of external aid likely to be required in different contingencies.

(b) Recommendations for international action

12. *It is recommended that* the Secretary-General ensure that the United Nations system assist countries with their planning efforts. To this end: an international programme of technical co-operation should be developed, aimed at strengthening the capabilities of governments in the field of pre-disaster planning;

- key responsibility at the field level should lie with the resident representative of the UNDP who would:

●● impress upon the government the importance of disaster preparedness

●● assist, in conjunction with the representatives of the agencies concerned, in the necessary planning, training and other arrangements through the Office of Disaster Relief, the agencies of the United Nations system such as FAO, UNESCO, WHO, ITU, WMO, UNDP, UNICEF, WFP should collaborate on a master plan and/or programme for co-operation in cases of natural disasters ;

● international voluntary agencies and individual governments should be invited to participate in the preparation of such a master plan

●● governments should inform the Office of the assistance they might be in a position to provide through the United Nations system

● competent bodies within the United Nations system should review and appraise their own programmes in the light of the overall master-plan international agencies—especially UNICEF, WFP—should devise a plan for the stockpiling of food and supplies at the international, regional and national levels.

Subcommittee I

The Planning and Management of Human Settlements for Environmental Quality

Dr. Frank P. Lloyd, Chairman

President, American Society of Planning Officials

Mrs. Lucy Benson
President, League of Women Voters

Mayor William Dyke
City Hall
Madison, Wisconsin

Mr. John W. Hanes, Jr.
Vice Chairman of the Governor of
Virginia's Council on Environment

Dr. Philip Hauser, Director
Population Research Center
University of Chicago

Mr. James E. Mack, Member
National Urban League

Mr. John D. Harper
Chairman of the Board, ALCOA

Subcommittee Director
Robert E. Agus

2. Resource Management

Environmental Aspects of Natural Resource Management

INTRODUCTION

Throughout the history of mankind's life on earth our development has depended on the environment. Today, we remain dependent on the resources of the earth, not only for continued growth but also for survival as a species. We now realize the land, air, and water are not inexhaustible in quality or quantity—each of these vital media is increasingly burdened with pollutants. Oil, copper, natural gas, and other essential nonrenewable resources may be exhausted in our lifetime or that of our children. No longer can we view our environment smugly—blinded by material comfort to the inequities which have fostered exploitation of our global resources. Neither can we ignore the earth's signals of deprivation for future generations. Conservation and protection of the earth's resources is costly in the short run—costly enough to require changes in our economic systems—but economical and indispensable in the long run: economical because early depletion of vital resources through indiscriminate exploitation will entail more massive economic dislocations later; indispensable because without wise stewardship of resources, our continued existence as a viable species is in peril.

Environmental aspects of natural resource management are primarily the subject of national, rather than international, action. However, because of the major political and economic influence of the United States in the international community and our role as a prime consumer of natural resources, it is evident that our domestic actions in natural resources management significantly affect the international market place.

Any recommendations regarding the environment should be made with the awareness that the proposed allocation of resulting costs must

be acceptable to the citizens of the United States. Only through citizen acceptance can effective environmental policies be developed and implemented. Furthermore, some of the following recommendations should be implemented on a gradual or sequential basis to allow time for the economic and political structures of the United States and the international community to adjust.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE

1. Integrated Resource Management

The United States should support a policy of integrated resource management. Of the following proposals, those which relate to national action may apply to other developed countries as well as the United States.

A. Serious consideration should be given to governmental regulation of the consumption of national nonrenewable resources and to similar regulation of natural resources under international jurisdiction, such as fisheries and seabed minerals, with any fees considered a source of environmental financing.¹

B. An international equivalent to the environmental impact statements required under section 102(2)(c) of the National Environmental Policy Act should be established. Such statements would be filed by governments and international organizations, and indicate the relationships of a proposed venture to the use of natural resources as well as other effects on the environment.²

C. Standards for environmental quality, product safety and quality, and workers' health and safety should be established.

D. Serious consideration should be given to establishing an assessment on nations related to their degradation of the global environment.

E. Serious consideration should be given to the creation of an assessment on consumption, related to the depletion of nonrenewable natural resources.

F. National policies and programs which act as negative environmental incentives should be abolished in order to harmonize these policies with sound environmental principles.

G. The United States should continue to explore new alternatives for its participation in international markets in order to provide outlets for increased productivity and to minimize the economic disloca-

¹ See ch. V, United Nations Recommendation 37.

² See ch. VI, Advisory Committee Recommendation 6 and ch. V, Advisory Committee Recommendation 1.

tions which may result from the imposition of domestic environmental standards.

H. Research on recycling, the use of synthetics, and waste disposal should be expanded.

I. The United States should condition export credits to domestic companies upon compliance with United States environmental, health, and safety standards.

J. As a prerequisite to all foreign assistance, the United States should require recipient nations to prepare long-range plans that consider environmental matters.

2. Agriculture and Soils

A. Research, planning, and market adjustment should be expanded to foster the stability and growth of rural areas.

B. Agricultural planning should provide for the protection of (local) ecosystems.

C. Research leading to the development of agrochemicals and non-chemical alternatives compatible with the environment should be accelerated.

D. The United States should increase research into more efficient modes of consumption and disposal of agricultural products and byproducts.

3. Forests

A. Programs of reforestation and sound forest management should be encouraged.

B. The cost of environmental protection measures should be included in the cost of forest products.

C. Research on the relationship of forests to the global environment should be encouraged.

D. Research into and increased use of recycling of forest products should be fostered.

E. Further research and rapid implementation are required to reduce the pollution and needless waste stemming from the manufacture, distribution, and use of forest products.

4. Wildlife, Parks, and other Protected Areas

A. The Committee supports the concept of a World Heritage Trust.

B. The Committee urges a meeting of all interested nations, as soon after the Stockholm Conference as possible, to develop an effective convention on the Export, Import and Transit of Certain Species of Wild Animals and Plants.

C. The United States should assist developing nations in their efforts to maintain protected wildlife and natural and cultural areas.

D. Interest-free loans for these purposes should also be considered.

E. Planning for the protection of wildlife and natural areas should be supported.

F. Adoption of multilateral agreements concerning the management of protected areas near national boundaries should be encouraged.

5. Genetic Resources

A. The United States should share the financial and operating responsibility for the creation of regional centers for the collection, conservation, and study of genetic resources.

B. The compilation and free dissemination of information and the start of a coordinated planning approach concerning the future of genetic resources is recommended.

C. The United States should continue to conserve and protect its own natural genetic resources.

6. Fisheries

A. The United States should encourage consolidation of existing multilateral fisheries agreements and commissions.

B. Institutional arrangements for a system to allocate fisheries resources harvested in international waters should be established.

C. The United States should act promptly to assure the maximum protection of its estuarine and coastal spawning grounds.

D. The United States should undertake expanded research into aquaculture.

E. The establishment of strict international fisheries product quality standards should be supported.

F. The international community should expand research into the various aspects of water resources.

G. The United States should insure that all agreements on the harvesting of fisheries resources to which it is a party include a provision for inspection and monitoring independent of commercial interests.

7. Water ³

A. The United States should support the establishment of at least the minimum water quality standards required for human health and the preservation of ecosystems on the national, regional, and international levels.

³ See response 159 to United Nations Recommendation in this chapter; ch. III, Advisory Committee Recommendation 5.

B. The United States should participate in regional agreements providing for the protection of shared water resources.

C. The United States should increase efforts to provide to other nations technical information and expertise to insure an adequate water supply of the required quality.

D. Multinational accords to limit national actions with negative environmental effects on international water resources should be strongly endorsed.

8. Mining and Primary Mineral Processing

A. The United States should expand research on mineral consumption efficiency, with a special emphasis on recycling.

B. Adequate measures for the environmental protection of all mining and processing areas should be developed.

C. A standard requiring use of the best available technology should be adopted for the protection of workers' health and safety in connection with the extraction and processing of natural resources.

D. A comprehensive international inventory of existing mineral resources should be supported.

E. Research and development of controls on mineral waste disposal should be increased.

9. Energy

A. Improving the efficiency of current uses of energy at all stages should be furthered.

B. The cost or benefit of moving to a more rational use of energy should be passed on to the consumer.

C. National energy policies and uses should be studied and reoriented to foster the conservation of existing energy resources. Furthermore, the Committee urges expanded and coordinated research concerning new energy resources.

D. The international community should develop monitoring systems to assure that energy use is consistent with protection of the environment.

DISCUSSION OF THE RECOMMENDATIONS

1. Integrated Resource Management

An integrated management approach to natural resources involves use of a variety of tools to make the most efficient use of resources compatible with an environment that can sustain all beneficial eco-

systems in optimum living conditions. It is essential that United States national policies and priorities be consistent with wise natural resources management. Natural resource use should be considered in relation to the local ecology, the regional and national environment, and to socioeconomic structures and conditions.

Long-term, wide-spectrum planning is the key to effective integrated management of natural resources. Each nation is primarily responsible for planning its use of natural resources, consistent with man's needs in the global environment. The Committee recommends that:

A. The consumption of nonrenewable resources should be regulated in view of responsible predictions that certain of these (e.g., oil and copper) will be exhausted in the foreseeable future at present rates of consumption. One type of such regulation is a permit system to insure that nonrenewable resources consumption is consistent with the need for conservation and other sound environmental policies. Studies required before the issuance of a permit should provide the information upon which to make resource allocation decisions. Close attention should be paid to such economic factors as the need for regulated prices to include all appropriate costs (e.g. environmental costs and scarcity) in order not to encourage needless consumption. Permits might specify environmental standards or requirements for the development of the resource. For example, the renewal of surface lands in connection with strip-mining operations might be required. The international community, as well as individual nations, should consider adopting such a procedure for resources under international jurisdiction. The fees from permits or licenses are a potential source of revenue for national or international environmental funds. The United Nations study of appropriate international environmental financing methods proposed in Recommendation 38 of the Conference Secretariat paper on "Development and the Environment" should include this proposal and those in C, D, and E below.

B. An international equivalent to the United States environmental impact statement will be an essential first step for achieving sound environmental management. The statements will provide the basic information required for responsible decisions consistent with environmental policies. In addition, nations should agree to submit annual statements to the United Nations on planned actions which will have significant environmental effects, especially those with effects that extend beyond a nation's boundaries.⁴

C. The establishment of standards dealing with environmental quality, product safety and quality, and workers' health and safety is another method for the sound management of natural resources.

⁴ See chs. V and VI.

The United States has begun to incorporate such concerns into its national policies. The development of more stringent and more widely applicable standards especially for international resources, exported products, and private enterprise operating abroad should be seriously considered.

D. Another device for the environmentally sound management of natural resources is the use of such negative incentives, as taxes, fines, and assessments. The United States should recommend and participate in a multinational study of an international assessment on nations based on their contribution to the degradation of the global environment. Such an assessment could provide funds for international environmental use, such as oceanographic research and pollution control.

The United States should also consider the imposition of a similar national assessment. Such an assessment should be made at the production stage in such a manner that its burden could only be passed on to the consumer if the best available technology were being utilized. This approach places the economic burden on the primary source of pollution. Similar assessments should be explored in connection with transportation and processing beyond the initial production stage. Finally, assessments should be considered at the consumption stage when consumption itself contributes to pollution, as in the case of automobiles. All funds derived from such an assessment should be designated for further environmental programs.

E. Another possible source of funds for environmental improvement is an assessment based on the consumption of nonrenewable resources on both the international and national levels. It could be levied at the production stage and passed on, in the product cost, to the consumer with resulting funds allocated to research into such methods of conserving the resource as recycling and development of alternative materials. While nations consider establishing such an assessment for their resources, an international assessment should be considered for the depletion of international resources.

F. Effective global environmental action will require the maximum harmonization of national and international policies. The first step toward such harmonization will be the development of consistent national policies, which is yet to be achieved in the United States. Thus, the United States should undertake a study of existing policies and programs to insure their compatibility with national environmental policies and programs. In addition, national policies should be evaluated within the global context. For example, the farm subsidy program which rewards reduced production should be examined in relation to the increasing international need for food products. Similarly, the

tax concept of a depletion allowance for oil and ore companies should be reevaluated in light of the need to conserve these vital national resources.

G. Effective resource management planning must account for the consumption of resources in a given market since the laws of supply and demand control resource development. In this regard, expanded United States participation in the international marketplace should be fostered, consistent with the adoption of sound environmental policies. One way of expanding participation is to increase the use of the barter system in the international marketplace. Building upon the example of the proposed trade of United States grain for Siberian gas and oil, the United States should explore the options and alternatives for this type of multinational agreement.

H. We recommend that research regarding synthetics, recycling, and waste disposal be emphasized. In view of the technological and financial capability of the United States and other developed nations, these nations should assume primary responsibility for determining the best technical means to maximize the efficient use and conservation of natural resources. The technological and scientific resources of this Nation should be enlisted fully in cooperative research and training programs with the developing nations. The developed nations should apply their technology to increase efficiency in production, consumption, recycling, and disposal of natural resources, as well as exploration for new resources.

I. In the international marketplace, the United States, at a minimum, should not grant export credits to domestic firms for products which do not meet United States national standards or are clearly detrimental to the human environment. Concurrently, the United States should seek international cooperation to minimize competitive disadvantages arising from the implementation of sound environmental practices.

J. As a prerequisite to foreign development assistance, the United States should require recipient nations to prepare long-range plans that adequately consider environmental matters. This approach should be similar to the requirement of the Land and Water Conservation Fund Act (16 U.S.C. 460L-8(d)). Aid funding and technical assistance should be made available for developing such plans. In order to provide recipient nations with adequate time to formulate these plans, this requirement should take effect commencing in 5 years. Such long-range planning would have to meet minimum requirements regarding form and substance.

2. Agriculture and Soils

Agriculture forms a base for the economic development of many nations. Historically, the industrialized nations first developed their agricultural resources to assure an adequate food supply and only then were they able to industrialize. This pattern continues today in the developing nations. Although the pressure for immediate industrial development is greater than ever before in the developing countries, agriculture is compatible with and indeed essential to economic development.

In addition to providing food, agricultural resources management must aim at efficient land-use to free the land for nonagricultural purposes; such development and use of agricultural resources requires detailed long-range planning.

A. To achieve maximum efficiency of production, consistent with a sound environment, agricultural planning should consider product and soil technology; local and national market conditions; and social, industrial, urban, rural, and economic goals of the nation relevant to agricultural resources development. The essential role of rural areas should be emphasized, including possible planning for certain types of industries. The United States should make its technical resources and managerial experience increasingly available to all nations. The United States should support international exchanges of expertise and information, and cooperate to minimize the duplication of research efforts.

B. Planning for agricultural areas should include appropriate protection for local ecosystems and the regional environment with special attention to major shifts in land use.

C. Maximizing agricultural production requires considerable use of agrochemicals, which until recently, were used without recognition of their full ecological consequences. However, recent research clearly indicates that some of these chemicals, used as fertilizers and pesticides, are detrimental to man and his environment. The United States should provide the international community, as quickly as possible, with effective and economic, alternative chemicals—as well as nonchemical alternatives—which are consistent with a healthy environment. Until suitable alternatives are available, the United States should publicize all information on these chemicals, so that purchasing nations can make informed and rational choices. This information must include the health and safety precautions for people who come in contact with the chemicals in their transportation and use. If any chemical is clearly detrimental to man or the human environment, the United States should seek, as soon as possible, an international agreement prohibiting or restricting its production or use.

D. The United States should increase research into improving efficiency in the consumption and disposal of agricultural products and byproducts. This research should emphasize the agricultural products recycling and the treatment of wastes. In this way the increased efficiency in production and land-use can be matched by increased efficiency in consumption, conservation, and disposal.

3. Forests

Forests provide man with a primary resource which can be managed on a renewable basis. The uses of timber and timber byproducts are myriad and particularly important in the developing nations where steel and other structural products are not readily available. In addition, forests play an integral part in protecting the local topography and in influencing climatic conditions. Since the majority of the world's forest resources are publicly owned, they provide an excellent area for developing sound management practices.

A. The Committee recommends the development of reforestation programs for harvested lands consistent with national and regional land-use plans. Such programs should consider carefully the number and the species of trees replanted. In addition, harvesting should be sequential, so that a continuous supply of the necessary species is available. The United States should encourage this practice, nationally and internationally, with technological and management assistance. Government programs or operations should provide reforestation, or restoration consistent for the long-range land-use planning.

B. The costs of such environmental measures such as reforestation and limiting harvesting to protect watersheds, prevent dustbowls, maintain climatic conditions, and serve other vital purposes should be included in the product cost.

C. The world's forest cover should be assessed for both quality and mix. The United States should urge research to establish the relationships of national and regional forests to the global environment.

D. The United States should undertake research with other technologically advanced nations into the recycling of forest products and waste disposal. Needless consumption patterns should be altered, based on this research, in order to preserve forest resources and prevent pollution.

E. Further research should be undertaken by the developed nations into the timber industry operations, such as paper and pulp production, to provide adequate pollution control equipment to protect the environment. The important factors of site location should receive careful study.

4. Wildlife, Parks, and Other Protected Areas

The value of wildlife and wilderness areas has been universally recognized. However, while the developed nations have the resources to maintain such areas, many of the developing nations lack funds for these purposes. Moreover, the existing management expertise lies primarily in the developed nations.

A. The United States should support the final formulation of the convention on the *World Heritage Trust* as soon as possible after the Stockholm Conference. Adequate provision for the use of trust funds for restoration as well as preservation of designated areas should be included. Obviously, only natural or cultural areas of international significance should be included. Adequate provisions should be made to insure their proper management and maintenance: this may include provision for the withdrawal of an area's designation under the convention. The United States should emphasize its willingness to give technical and management assistance in furtherance of the convention.

B. The Advisory Committee proposes that the United States introduce a substitute to the proposed convention on the Export, Import and Transit of Certain Species of Wild Animals and Plants. While strongly supporting the proposal for an international convention to regulate international trade and exploitation of wildlife, no adequate draft of such a convention is ready for presentation at the Stockholm Conference. The substitute recommendation ought to provide that interested nations agree to meet as soon after Stockholm as possible to develop an effective convention on the *Export, Import and Transit of Certain Species of Wild Animals and Plants*. Such a convention should address itself to the following:

1. Provisions should apply from egg or seed stage through maturity.
2. Designated species should be protected in sufficient numbers to fulfill their proper ecological role and the designated species should include species in addition to those presently in danger of extinction.
3. All imports by signatory nations must be in accord with the domestic laws of the nation of origin for the species.
4. Effective monitoring provisions regarding export, import and transit should be established.
5. Timely sanctions or penalty mechanisms should be provided.
6. Any signatory can establish more stringent domestic laws regarding its imports.

The United States, as a major consumer nation, should take the lead in proposing and supporting the strongest protective measures in the development of the convention. Moreover, the general recommendations concerning treaty formation contained in chapter VI of this report ought to be followed.

C. The United States should provide, to the maximum extent possible, assistance in the form of technical assistance and training, to developing nations for the maintenance and management of protected wildlife, and natural and cultural areas. The objective of such assistance would be to enable the recipient nation to assume its full share of responsibility for the management and preservation of these areas as soon as possible.

D. The United States should consider financial support, perhaps in the form of interest-free loans, to help protect significant areas.

E. The United States should support planning for the protection of wildlife and natural areas, including revenue producing factors to the extent that these factors, such as tourism, are not inconsistent with the ecological system to be protected.

F. The United States should seek the adoption of multilateral agreements concerning the management of protected areas near national boundaries.

5. Genetic Resources

The matter of genetic resources is similar to that of the protection of wildlife and natural areas. The necessary financial resources and technology are located in the developed nations while many of the natural gene pools which should be conserved are in the developing nations. These gene resources are essential for preserving development options, especially in agriculture. Conservation of animal, plant, insect, and micro-organism germ plasm requires considerable technical knowledge and equipment; at this time, all primary gene banks are located in the developed nations.

A. The United States should support the creation of regional centers for the collection, conservation, and study of genetic resources of animal, plant, micro-organism, and insect germ plasm. The United States should cooperate with other developed nations in assuming financial and technological responsibility for setting up regional centers throughout the world.

B. We recommend the compilation and free dissemination of available information on the still largely unpublicized subject of genetic resources. We also recommend that there be initiated a fully coordinated planning approach concerning the future conservation of genetic resources.

C. Nationally, the United States should continue to conserve and protect its natural genetic resources to preserve the future options of this country and other nations.

6. Fisheries

The fisheries resources of the world pose a difficult management problem. Many of the world's fisheries resources harvested in international waters, while breeding and development occur within national waters. Also, the fisheries resource is dependent on water quality, which is subject to pollution by coastal nations.

A. The United States should encourage consolidation of the many existing multilateral fisheries agreements and commissions into a more cohesive and coordinated structure to deal with the world's fisheries resources. This consolidation should be done in conjunction with the proposed Law of the Sea Conference scheduled for 1973.

B. Institutional arrangements should be established to develop a system for allocating fisheries resources harvested in international waters. Fisheries must be managed to insure sufficient quantity to fulfill ecological roles and adequate quality for human consumption. Resources must be protected from over-fishing, and from national and international degradation of the water environment, especially in relationship to estuarine and coastal breeding and nursery areas. Appropriate harvesting limitations and technologies must be explored by the United States in cooperation with the international community.

C. Special attention must be given to the issue of the pollution of both fisheries and the water environment on which they depend. The United States must act as quickly as possible to assure the maximum protection of spawning grounds in its estuarine and coastal areas from inland pollution.

D. The United States should undertake expanded research into aquaculture. This should include not only fisheries but also marine plant resources. The objective should be the development of technical knowledge and methods required so that fisheries can be managed as renewable resources.

E. The United States should support the establishment of strict international product quality standards of fisheries resources for human consumption of both imports and exports.

F. Nationally and internationally, the objective of fisheries resource management should be to achieve the optimum possible yield from the resource without reducing the resource below ecologically acceptable limits. The United States and the international community should undertake further research into the relationships among the many aspects of water resources.

G. Agreements on the harvesting of fisheries resources to which the United States is a party must provide for inspection and monitoring independent of commercial interests.

7. Water

Water, due to its extraterritorial nature, is a resource which poses significant management problems. The quality and quantity of one nation's water resources are affected by other nations' actions, as is illustrated by the Rhine River. The ramifications of national actions on international waters are also clear.

A. The United States should develop national policies regarding water quality and quantity which flows from within its national jurisdiction into waters beyond its jurisdiction. In this regard, the United States and the international community should support the establishment of minimum international water quality standards.

B. The United States should participate in regional agreements providing for the protection of shared water resources, such as the Gulf of Mexico. Adequate provisions must be made for monitoring such water resources, enforcing national compliance, allocating resources, and assessing damages and settling disputes.

C. The United States and other developed nations should increase efforts to provide technical information and expertise to other nations to insure an adequate supply and quality of water. Long-range national and regional planning should consider the allocation and quality of available water resources in relationship to the development of agriculture and industry.

D. The United States should strongly endorse multinational accords which govern national actions with significant environmental effects on international water resources.

8. Mining and Primary Mineral Processing

Minerals are essential to industrialized society, and the demand for minerals is increasing constantly. While consumption in the developed nations continues to grow, the developing nations are also beginning to consume the mineral resources of the world. Primary mineral resources are finite; therefore, planning must consider the limits on the future supply of each resource. Furthermore, many mining processes and practices are presently incompatible with a healthy environment, because they produce a significant amount of pollution and temporarily preempt land which may be better utilized.

A. The United States should expand research into increasing the efficiency of consumption of minerals, with particular attention to recycling.

B. The national and international actions of the United States, and its citizens should take into account the side effects of mining and processing, and adequate measures for protecting the environment

should be developed and included in all future operations. One valuable management tool is requiring renewal of strip-mined areas, the cost of which should be included in the product cost.

C. The United States must require, wherever possible, the use of the best available technology to insure miners' health and safety. As the best technology in one situation may be inappropriate in another, the choice should be based on all relevant information. The United States should make all information and technology in this area available to other nations.

D. The United States should support an international assessment of existing mineral resources and upon completion of this, plan its own future economy. Such assessment may well result in the development of international accords and altered markets.

E. The United States must undertake research and the necessary controls on mineral wastes disposal in ways that do not affect the environment adversely. Such regulation should apply both to the government and to the private sector.

9. Energy

The management of energy resources must be accomplished with the realization that energy is vital for the progress of any society. Also, it is evident that at each stage of the energy flow, there are detrimental side effects on the environment.

A. As the major consumer of the world's present energy resources, the United States should examine the current uses of energy to insure maximum efficiency at all stages. Efficiency in production, consumption, and transportation must be improved to maximize available energy resources. This examination should consider unnecessary energy consumption, such as high horsepower internal combustion engines. In addition, the international community should explore possible energy consumption limitations.

B. The consumer should assume the cost burden or benefit of moving to a more rational use of energy only if national policies are consistent and such government subsidies as the oil depletion allowance and immediate writeoffs for exploration expenses are eliminated. Otherwise, the result will be that the consumer bears the burden for the producer as well as himself.

C. The United States, in cooperation with the international community, should study the conservation of energy, exploration for undiscovered energy resources, and research on new energy sources.

D. The United States and the international community should develop appropriate monitoring systems for assuring energy use consistent with the environment.

RESPONSES TO U.N. RECOMMENDATIONS

Responses of the Advisory Committee to the Recommendations of the Report by the Secretary-General of the U.N. Conference on Human Environment on the "Environmental Aspects of Natural Resource Management" (A/CONF. 48/7, 26 January 1972).

A. Agriculture and Soils

(i) *Consideration for Action.* (omitted)

(ii) *Recommendations for National Action*

It is recommended that governments give consideration to following proposals:
34. Governments should develop agricultural plans and policies to enable farmers and agro-industries to fulfill their responsibilities in maintaining the quality of the human environment.

- Agriculture will need to be increasingly recognized as an activity of general public interest:

- for supplying food and other essential products in sufficient quantity and of satisfactory quality

- for ensuring the conservation of a large part of the natural resources and of the environment

- for employment opportunities in order to avoid excessive urban concentrations

- for maintaining and enhancing the quality and attractiveness of rural areas for recreation and as buffer zones between urban areas

- for recycling wastes emanating from sources such as municipal sewage.

At the planning stage, the adverse environmental impacts of development plans on agriculture and conversely the harmful environmental effects of agricultural development should be prevented.

The local environment will have to be regarded as a functioning ecosystem within which agricultural development takes place and to which it adapts, and not the reverse;

- the conventional preoccupation with agricultural outputs must be balanced by a consideration of inputs and their environmental implications.

An ecological appreciation explains the need for various inputs beyond the capabilities of the individual farmer but required to maintain successfully an artificial equilibrium:

- plant breeding programmes and the salvaging of threatened genetic resources

- soil and water conservation measures

- monitoring and control of soil, water, and plant contaminants

- integrated controls of insects, weeds and other pests.

Agricultural and soil institutions should play an increasing role in the assessment of land capabilities and in advising planners and designers of development projects.

Agricultural development plans and investment programs should make provision for the early implementation of those basic land improvement and soil conservation projects and facilities for waste disposal which individual farmers and agro-industries cannot afford to carry out by themselves.

An important part of the agricultural planning process and other aspects of rural planning should be carried out at the local level so as to involve the farming community and enlist their participation in improving the quality of rural life.

Response: 34. The Advisory Committee concurs.

35. Governments should conduct selective base line surveys of agricultural areas where basic agricultural resources are known or suspected to be suffering environmental degradations.

Prior to selecting priority areas, collecting and review of available surveys, inventories and data should be made in order to identify specific sources of environmental degradation ;

- subjects for study include loss of soil productivity ; loss of useful genetic resources ; depletion of grazing lands ; recurrent destruction of crops, livestock and wild herbivores by pests, diseases, or pollution ; accumulation of harmful agricultural wastes ; and indications of climatic changes.

More comprehensive interpretations of existing data then be made to identify similar agricultural areas ;

- inter-relationships among ecological conditions, types and intensities of land use and management practices, and problems of environmental degradation should all be depicted.

On this basis, priorities for urgent actions of conservation and protection of agricultural resources and for additional surveys and research should be established ;

- these should consider the areas where the productive capacity of the resources and the agricultural products are most affected or threatened by environmental degradations.

Capabilities of existing institutions should be strengthened accordingly to undertake the action required.

Additional inventories and surveys should then be continued by sectors in priority areas ;

- these should be developed by successive stages of approximation and detail
- they should make provision for periodic joint compilation and interpretation, including consideration of environmental effects of agriculture on other resources such as air, water, aquatic resources and wildlife.

Response: 35. Advisory Committee concurs.

36. Governments should keep systematic records of environmental problems caused by or affecting agriculture using the above base-line surveys.

The existing agricultural institutions (e.g. research institutes, field stations and other services) should provide the necessary network for these monitoring activities.

Special emphasis should be placed on surveillance of soil degradation and on early warning systems for pests, diseases and pollutants affecting crops, livestock and the quality of agricultural products.

Response: 36. Advisory Committee concurs.

37. Governments should strengthen basic agricultural research to improve ecological understanding.

Research should be undertaken in selected ecosystems and problem areas on the general subjects of:

- the functioning and productivity of agricultural systems
- the processes of degradation of land resources and contamination of agricultural products
- the environmental effects of certain specific agricultural practices and agricultural inputs, particularly agro-chemicals
- the relationship of climate to the above items.

In addition, a variety of ecologically-sound management opportunities merit study:

- the recycling of municipal wastes, including their detoxication, onto agricultural lands
- multiple cropping in the tropics, including considerations of crop combinations and sequences, cover crops, fertilization and weed control
- systems to re-utilize the wastes of agricultural runoff
- integrated pest controls, including combinations of regulated pesticide use, cultural controls, crop diversification.

Response: 37. The Advisory Committee concurs.

38. Governments should direct their agricultural research services and field stations to incorporate environmental considerations into their programmes of investigation and experimentation.

The findings of basic ecological research should be applied to the study, design, and experimentation of ecologically stable systems of land use and agricultural practices, particularly in tropical and subtropical areas, whereby:

- the productive capacity of land resources can be maintained on a long-term basis
- wastes can be disposed of or recycled in these systems without harmful effects on natural resources or on the environment generally.

In testing various combinations of crops and/or livestock, agricultural inputs and management practices and in attempting to maximize yields or economic returns, experiments should be designed to assess:

- possible environmental side-effects of run-off, erosion, and other forms of soil degradation and of the accumulation of harmful residues, especially those from agro-chemicals
- the technical ability of local farmers to introduce new land use practices without causing deterioration to agricultural resources and the environment
- the economic feasibility of implementing agricultural practices which can better protect the resources and the environment without adding to farm management costs. To this end, special investigations should be undertaken to evaluate the costs and long-term benefits of environmental protection practices in agriculture.

Agricultural research institutions should, wherever feasible, use radioisotopes and radiation techniques to develop new, safer and more efficient management practices ;

- this applies particularly to the application of fertilizers, pesticides, and irrigation water and to the biological control of pests.

Response: 38. The Advisory Committee concurs.

39. Governments should develop and facilitate information exchange and transfer of experience in agriculture within an ecological framework.

The transfer of information and experience in agriculture should be based upon similar ecological conditions, especially climate and soil.

Within this framework, relevant and selected information should be made readily available to potential users (e.g. planners, extension services, farmers) in a form easily understandable and applicable, on :

- soils, their characteristics, capabilities, and limitations for different uses
- genetic resources, their requirements, potential resistance to pests and other adverse factors
- agricultural practices most suitable for both increased production and minimum environmental damage, particularly soil conservation practices and integrated pest control techniques
- most appropriate methods of agricultural waste disposal and recycling under local conditions.

40. Governments should introduce environmental considerations into their programmes of agricultural education and training.

More emphasis should be placed on the creation of an understanding of :

- the vital rôle of agriculture for man's welfare and for the maintenance of environmental quality
- the environmental problems related to specific management practices, particularly those related to soil conservation and pest control
- the limits to the carrying capacities of natural resources under particular farming or grazing conditions.

These considerations should be introduced at all levels of training and education.

41. Governments should introduce an institutional and legislative framework which accounts for the environmental dimensions of agricultural development.

Soil and agricultural institutions should be directed to consider the ecosystem as an operative unit in the management of air, soil, plant, and water resources ;

- land settlement, agrarian reforms, and land consolidation should recognize local diversities of soil and climate.
- • the extension and intensification of agriculture should be modified accordingly.

Land use capabilities should serve as a basis for land zoning, land use legislation, licensing and regulations ;

- measures should be designed to respond to degradation resulting from misuse of croplands, misuse of agricultural inputs, and from the careless disposal of agricultural wastes.

Response: 39-41. The Advisory Committee concurs.

42. Governments should consider the needs to provide incentives and assistance to farmers and agro-industries.

Measures could include, depending on a given country's social and economic system, credit, better marketing facilities, tax reduction or exemptions, and subsidies in cash or in kind.

Such measures would induce or enable recipients to undertake necessary actions to prevent or correct environmental degradation of general public interest caused by their activities.

Examples would include soil conservation, use of more selective pesticides, and recycling of wastes.

43 Governments should establish or strengthen national programmes of conservation of soil resources.

According to local conditions and requirements, these programmes may place emphasis on one or more of the following areas :

- rain fed crop lands, particularly dry farmed areas
- irrigated lands with salinization, alkali and waterlogging hazards
- erosion along rural roads and highways
- grazing lands, particularly in arid areas
- wind erosion, stabilization of sand dunes
- watershed protection and afforestation
- marginal lands, i.e. those areas falling between lands where intensive agricultural production is feasible and those unfit for agriculture and requiring protection.

The programme should be integrated with the actions proposed earlier on base line surveys, research, assessment of land capabilities, assistance to land use planning authorities, development of ecologically stable agricultural systems, soil conservation legislation, extension work and assistance to farmers ;

- as such, it will go well beyond the mere promotion of soil conservation, erosion control practices, and land improvement works.

A number of specific measures might possibly be employed :

- erosion might be controlled through the use of various forms of mulches, primarily in the form of crop residues ; engineering and agronomic techniques to stabilize the soil and lessen the erosive force of wind and water ; control of fires ; overgrazing, and deforestation ; reseedling ; and terracing
- salinity and alkalinity control might employ knowledge of a plant's salt tolerance, the salinity of water used for irrigation, and the soil characteristics for adequate irrigation and leaching
- the leaching and depletion of soils particularly in the tropics might be reduced through controlling the intensity of agricultural use, by providing fallow periods, by introducing horticulture or pasturage instead of short-cycle crops or by the use of appropriate fertilizers.

Particular attention should be given in erosion control programmes to reducing sediment delivery to streams, reservoirs, dams and other water bodies in order to control physical, chemical and biological effects of these sediments on water quality and aquatic resources.

A special fund for the conservation of national soil resources may be needed to provide the necessary focus and means of action.

National soil institutions should be strengthened by reinforcing the soil conservation services and establishing, where needed, special units for land evaluation.

44. Governments should consider the possibilities of recycling agricultural wastes.

To the extent practicable and safe, animal or organic agro-industrial and municipal wastes could be used as fertilizers.

Likewise, crop residues could be used for composts or as animal feed.

In either case, the wastes or residues could be distributed to improve the structure and fertility of the soil.

- attention must be paid to guard against contamination of the soil resource and the spread of infectious diseases.

Wherever not feasible, these wastes should be collected, treated and disposed of under controlled conditions in order to:

- minimize pollution, contamination, fire and other hazards
- maintain the attractiveness and salubrity of rural lands and streams.

45. Governments should institute or reinforce national programmes to regulate the use of pesticides and other biocides and to develop integrated pest control.

Basic research is required on the fate and effects of pesticide residues in the environment and on their toxicity to man and other species.

Because of the recognized toxicity, persistence, and mobility of pesticides, particular care should be given to their efficient use.

Varieties and breeds more resistant to pests and diseases should be developed.

The hazards of pests and diseases should be evaluated before the introduction of new crops, breeds, or management practices.

Pesticides which are more selective and do not leave harmful persistent residues should be developed.

The introduction of new pesticides should be controlled by appropriate regulatory measures for testing, registration, labelling, marketing and utilization.

Biological pest control techniques such as the use of sterile male viruses pathogenic to insects, introduction of prey species and others should be developed and promoted with careful consideration for their possible environmental consequences.

Farmers should be trained in the safe use of pesticides and in integrated pest control techniques, including such management practices as proper selection; dosage, and timing and waste disposal techniques. Bodily damage to users might thereby be minimized.

Response: 42-45. The Advisory Committee concurs.

(iii) *Recommendations for International Action*

46. It is recommended that FAO, in cooperation with other international agencies concerned, strengthen the necessary machinery for international acquisition of knowledge and transfer of experience on soil capabilities, degradation, and conservation.

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

- the Soil Map of the World being prepared by FAO, UNESCO and ISSS should serve to indicate those areas among which transfer of knowledge on soil potentialities and soil degradation would be most valuable

- this map should be supplemented by establishing international criteria and methods for the assessment of soil capabilities and degradations and by collecting additional data based upon these methods and criteria

- this should enable the preparation of a World Map of Soil Degradation Hazards as a framework for information exchange in this area.
- 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.
- the FAO Soil Data Processing System should be developed beyond soil productivity considerations
 - to include the above data and relevant environmental parameters;
 - to facilitate information exchange between national soil institutions, and eventually soil monitoring stations.

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

- basic research on soil degradation processes in selected ecosystems under the auspices of the Man and Biosphere Programme
- applied research on soil and water conservation practices under specific land use conditions with the assistance of FAO and, where appropriate, other agencies (UNESCO, WHO, IAEA)
- research on using suitable soils for waste disposal and recycling
 - UNIDO, FAO, and WHO should enter into joint consultations regarding the feasibility of an international programme in this area.

These efforts for international cooperation in research and information exchange on soils should be closely associated with those of the UNDP-WMO-FAO-UNESCO programme of agricultural bio-meteorology, in order to facilitate integration of data and practical findings and support national programmes of conservation of soil resources recommended above.

47. It is recommended that government, FAO and WHO, in cooperation with UNESCO and IAEA, strengthen and coordinate international programmes for integrated pest control and reduction of the harmful effects of agro-chemicals.

Existing international activities for the exchange of information and co-operative research and technical assistance to developing countries should be strengthened to support national programmes described above, with particular reference to:

- basic research on ecological effects of pesticides and fertilizers (MAB)
- use of radio-isotope and radiation techniques in studying the fate of pesticides in the environment (joint IAEA/FAO Division)
- dose and timing of fertilizers' application and their effects on soil productivity and the environment (FAO)
- management practices and techniques for integrated pest control, including biological control (FAO/WHO)
- establishment or strengthening of national and regional centres for integrated pest control, particularly in developing countries (FAO/WHO).

Existing expert committees of FAO and WHO on various aspects of pest control should be periodically convened to:

- assess recent advances in the relevant fields of research mentioned above
- review and further develop international guidelines and standards with special reference to chlorinated hydrocarbons, pesticides containing heavy-metals, and the use of biological controls.

In addition, *ad hoc* panels of experts should be convened, by FAO, WHO and, where appropriate, IAEA, in order to study specific problems, and facilitate the work of the above committees.

48. It is recommended that FAO under its programme "War on Waste" place increased emphasis on control and recycling of wastes in agriculture

This programme should assist national activities recommended above relating to:

- control technology and recycling of crop residues and animal wastes
- control and recycling of agro-industrial waste
- use of municipal wastes as fertilizers.

Response: 46-48. The Advisory Committee concurs and urges that the programme be through a high-level U.N. agency.⁵

B. Forests

(i) *Considerations For Action* (omitted)

(ii) *Recommendations for National Action*

It is recommended that national governments give consideration to the following proposals:

62. Governments should undertake both basic and applied research for improved forest planning and management.

Considerable knowledge already exists, particularly as relates to forest ecosystems and management in the temperate zones, that should be collected, evaluated, and applied where practicable.

General research needs, particularly in the tropical and subtropical areas, relate to:

- the functioning of "natural" and man-made forest ecosystems
- the mechanisms responsible for favourable or unfavourable influences of forest and forestry on other natural resources and on the environment
- the qualitative and quantitative effects of these mechanisms
- both genetic and economic considerations require development.

Research priorities in the tropics should be assigned according to the functions which require further knowledge;

- Immediate supplies of timber represent man's primary need, and vast tropical forest areas require management
- scientific knowledge of the life histories and growth requirements of trees and forests, upon which forest management is based, is largely lacking in the tropics. Research is needed on such processes as ecological succession, energy conversion and nutrient cycling before adequate management systems can be devised or their effects predicted
- research on the identification and potential uses of tropical timber trees must still take place in many cases, as must further study on the strength, density, chemical and other properties of such timber
- soil and water of tropical forest lands, causing problems after forest removal that are intensified by high temperatures and heavy precipitation, must be studied for prediction, correction and prevention

⁵ See ch. 6, Advisory Committee Recommendation 1.

- knowledge of the tropical rainforests, particularly the multi-storied hardwoods, is especially lacking
- research on forest resource survey methods and techniques is required
- the introduction or improvement of new species is of high priority of forest management
 - research is required to determine which tropical tree species are quick growing and most suited to intensive culture for early yields
 - insect and disease problems in the biotically-rich tropical forests must be anticipated, and means of prevention and control studied
 - the more effective use of forests and trees for the environmental improvement of human settlements in the tropics must also be studied
 - the benefits of trees to urban areas are potentially very high in the tropics, particularly because shade is so critical for daytime comfort.

Both present and future knowledge should be applied to develop multipurpose silvicultural methods that meet the demand for both increased production and environmental protection and improvement;

- although knowledge of the basic components—including their ecology and genetics—is often sufficient in the developed countries, management systems for their integration are frequently lacking
- specific research is required for:
 - the definition and standardization of criteria and methods for the economic appraisal of forest influences and for the comparison of alternative uses
 - the preparation of guidelines—to be periodically updated—for environmental forest management.

The potential contribution of different tree varieties to urban beauty, sound abatement, atmospheric quality, and temperature amelioration is poorly understood and underutilized and requires further study.

Research should be initiated on the laws, land tenure systems, and forest institutions now in use in order to find the combination that will ensure safe and profitable multiple uses of forests;

- research might be conducted along the following lines:
 - studies on the influence of land tenure systems on the protective and recreational role of forests
 - research on the development of public administration for environmental forestry
 - the revision of current education and training programmes to accommodate new techniques of forest resources management
 - comparative study, research and training in forestry legislation, wherever needed.

63. Governments should develop forest policies and planning as part of an overall policy for the rational and integrated use of natural resources.

Particular attention should be given to the rapidly increasing demands for and benefits from amenities which forests provide.

Forest zoning should be used as a basis for planning and management of forests and should be strengthened by adequate legislation and law enforcement.

Land use planning commissions both in rural and urban areas should seek the advice of environmental foresters to improve the appearance of urban and rural landscapes and reduce hazards of pollution and other nuisances by rational use of tree plantations.

Technology is needed to minimize damage to forests caused by fire, insects and diseases;

- means for fighting forest fires and pests, integrated pest control systems, and early detection and evaluation techniques should be developed.

64. Governments should design environmental forest management to meet the competing demands on forest resources

Modern forest management concepts, including multiple-use where desirable, should be introduced wherever feasible and in accordance with local conditions. Legislative and institutional provisions should be made, and accounting and budgeting procedures should be adjusted, to reflect the costs and benefits of the amenities which forests provide.

Special measures should be taken to ensure that the introduction of intensive forest management techniques and the extension of manmade forests will not cause the disappearance of useful forest genetic resources and of wildlife or seriously impair soil and water values.

Prevention and control of forest fires, pests and diseases should be given high priority.

65. Governments should introduce minimum management plans where none currently exist and governments already committed should increase their efforts

The opportunities of increasing public ownership and improving management of publicly-owned forests should be explored.

Attempts should be made to settle shifting cultivations to control the use of fire, and to demarcate forest resources.

Pilot projects using advanced management systems should be introduced into the developing countries, with appropriate assistance from the international community.

Responses: 62-65. The Advisory Committee concurs.

(iii) *Recommendations for International Action*

66. *It is recommended that* the Secretary-General take steps to ensure that:

- (a) The UN bodies concerned co-operate to meet the needs for new knowledge.

Where appropriate, research should be promoted, assisted, co-ordinated, or undertaken by the Man and Biosphere Programme (UNESCO), ICSU, or IUFRO, in close co-operation with FAO and WMO.

Studies on comparative legislation, land tenure, institutions, tropical forest management, and the effects of the international trade in forest products on national forest environments, and public administration, might be sponsored or co-ordinated by FAO, in co-operation with other appropriate organizations.

- (b) Continuing surveillance of the world's forest cover is provided for through the establishment of an appropriate monitoring system.

Such a World Forest Appraisal Programme would provide an indication of global environmental stability;

- the balance between the world's forest biomass and the prevailing environment would be continuously measured
- changes in the forests biomass, considered to have a significant impact on the environment, would be recorded.

The information could be collected from existing inventories and on-going activities and through remote sensing techniques.

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

67. *It is further recommended that FAO*

(a) Co-ordinate an international programme for research and exchange of information on forest fires, pests, and diseases.

The programme 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 influences of fires on forest ecosystems, to be undertaken by IUFRO; establishment of a forecasting system in co-operation with WMO; organization of seminars and study tours; the facilitation of bilateral agreements for forest protection between neighbouring countries, and the development of effective international quarantines.

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

(b) Facilitate the transfer of information on forests and forest management.

The amount of knowledge that can be usefully exchanged is limited by the differences of climatic zones and forest types.

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.

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

- the harvesting of some tropical hardwoods
- pine cultures
- the principles of forest management systems and management science
- soils and soil interpretations relating to forest management
- forest industries pollution controls, including both technical and economic data
- methods for evaluation of forest resources through sampling techniques, remote sensing, and data processing
- control of destructive fires and pest outbreaks.

Response: 66-67.—The Advisory Committee concurs.⁶

C. Wildlife Parks and Other Protected Areas

—Part One: Wildlife

(i) *Consideration for action* (omitted)

(ii) *Recommendations for National Action*

It is recommended that national governments give consideration to the following proposals.

⁶ See ch. 6, Advisory Committee Recommendation 1.

73. Each country should establish regions of nature reserves and other protected areas.

These areas should include adequate representation of all naturally occurring ecosystems, appropriate to the space and habitat requirements of the wild species involved.

The management of these regions will require an understanding of habitat requirements, at present known for very few species.

Assistance will frequently be required from the international community.

Response: 73. The Advisory Committee concurs.

74. Countries should enact and enforce protective laws regulating the harvesting and marketing of wild animals and their products, to guarantee that populations are not exploited to a degree that would threaten their survival.

Response: 74. Nations should adopt a policy of maintaining wildlife populations sufficient to fill their ecological role rather than following the "extinction standard" provided in the United Nations recommendation.

75. Governments should also exercise careful control over the introduction of exotic species into new areas with a view to preventing the displacement of indigenous species.

Where consequences are predictable, impacts should be considered before introducing the animals; where consequences are unknown, research will be required to predict the environmental effects of a given introduction.

Each country should consider the establishment of an advisory board of experts which would be independent of local decisions and which could have access to the world wildlife scientific community.

76. Methods for assessing the impact upon wildlife of building large-scale constructions, of clearing and developing land, and of altering present forms of land use, should be devised and implemented.

Estimates of potential impact should be taken into account in the early planning stages of any development project.

Where appropriate, intergovernmental organizations should co-operate in this assessment.

77. The consideration of wildlife resources and other habitat should be incorporated into land use planning and development, particularly in respect to long range considerations.

An evaluation should be made of the extent to which wildlife may interfere with adjacent forms of land use, complement existing forms of use by adding extra values, or be used as a major form of land use in its own right.

Response: 75-77. The Advisory Committee concurs.

78. Facilities should be developed, particularly in the developing countries, to attract and service tourism based on wildlife resources.

Large potentials should be developed by first promoting and supervising hunting tourism and, subsequently, expanding the tourist industry by providing for wildlife viewing and necessary infrastructure.

Governments, particularly those of the developing countries, should formulate demonstration cropping and hunting programmes for large game animals with substantial populations.

Those projects underway in Africa should be extended, and new ones initiated in the Middle East, Latin America and Asia.

Areas which should receive high priority are

- those where present forms of land use have proved unsatisfactory
- lands that are marginal to domestic animals, such as those frequently found in arid or adverse climates.

More experimentation and research should be undertaken on the biological and economic advantages of game ranching, and on the most efficient producers of protein, as a basis for future action.

Means should be examined and implemented to resolve the frequently occurring technical difficulties of harvesting, processing and marketing the meat;

- demonstration pilot schemes for developing commercial utilization of game, underway in Zambia and Kenya, should be expanded.

Response: 78. The Advisory Committee concurs and urges that due to the degradation that can occur to the environment of protected areas, attention be paid to the setting of reasonable limits on tourism.

79. Research is needed on habitat requirements.

This will contribute to the solution of many problems, ranging from those of species in danger of extinction to those of over-abundance of populations.

It will respond to the need for knowledge on productive meat management.

It will help determine the optimum size of areas and ensure high species diversity.

Research should include methods of assessing changes in the plant and animal communities and animal diseases.

The interaction of livestock with other forms of land use requires considerable study.

80. Governments should initiate or extend applied research projects to assess the interrelationships between forest and range management and wildlife populations.

Different combinations of forest and range management practices and wild species should be tested to identify situations where each complements the value of the other.

Response: 79-80. The Advisory Committee concurs.

(iii) Recommendations for international action

It is recommended that the Secretary-General take the following steps:

81. Ensure that the effects of pollutants upon wildlife are considered, where appropriate, within environmental monitoring systems.

Particular attention should be paid to those species of wildlife which may serve as indicators for;

- future wide environmental disturbances to other species.
- an ultimate impact upon human populations.

82. Ensure that a programme to expand present data gathering processes so as to assess the total economic value of wildlife resource, is established.

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 resource.

Such a programme should elaborate upon present FAO efforts and might well produce a yearbook of wildlife statistics.

Response: 81-82. The Advisory Committee concurs.

83. Ensure that the appropriate UN agencies cooperate with the governments of the developing countries to develop special short-term training courses on wildlife management.

The priority should be on conversion courses for personnel trained in related disciplines such as forestry or animal husbandry.

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

Response: 83. The Advisory Committee concurs and emphasizes the importance of role in the United States short-term training assistance.

84. *It is further 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 broadly-based convention might be considered which would provide a framework by which criteria for game regulations could be agreed and the over exploitation of resources curtailed by signatory countries.

Response: 84. The Advisory Committee concurs.

85. *It is recommended that governments move to agree to the proposed convention on THE EXPORT, IMPORT, AND TRANSIT OF CERTAIN SPECIES OF WILD ANIMALS AND PLANTS.⁷*

Response: 85. The Advisory Committee disagrees. See Advisory Committee Recommendation 4B of this chapter.

86. *It is recommended that governments agree to strengthen the International Whaling Commission and to consider an international agreement calling for a 10-year moratorium on commercial whaling.*

Response: 86. The United States should actively support an international accord establishing a moratorium on the taking of all whales listed on any recognized endangered species list. Moreover, the taking of all whales and aquatic mammals not on any endangered species list should be reduced by at least 50 percent. Appropriate mechanisms for independent monitoring of the provisions of such an agreement are essential. Provisions should also be made for continued research and surveys into the status of the whale resources of the world.

Part Two: Parks and Other Protected Areas

(i) *Consideration for action (omitted)*

(ii) *Recommendations for national action*

It is recommended that national governments give consideration to the following proposals.

91. Governments should set aside wildland wherever possible.

Policies which provide for the needs of tourism and recreation and for the protection of representative ecosystems should guide such action.

92. Governments should engage in research on park management, with particular emphasis on:

Assessing the recreational carrying capacity of individual ecosystems and subsequently the desirable rates and scale of their development as parks.

Determining the optimum use for different protected areas, including the appropriate zoning for single or multiple use.

Identifying the most appropriate means of organizing and managing large numbers of people within protected areas.

93. Governments should educate their peoples on the value and purposes of protected areas and design means to use parks as an educational tool.

The concept that "parks are for the benefit and enjoyment of people" should be communicated, particularly in the developing countries.

Educational tourism should be promoted within the services of protected areas.

94. Governments should accelerate the development of recreational facilities within or nearby urban areas.

Such action would relieve pressures on over-extended national parks.

Measures of landscape planning such as cluster development of new housing areas and decontamination of polluted waters should be stressed.

Response: 91-94. The Advisory Committee concurs.

(iii) *Recommendations for international action*

95. *It is recommended that governments and the Secretary-General give special attention to training requirements.*

High level training should be provided and supported;

- in addition to integrating aspects of national park planning and management into courses on forestry and other subjects, special degrees should be offered in park management.

- the traditional forestry or geology background of the park manager must be broadened into an integrated approach

- graduate courses in natural resources administration should be made available in at least one major university in every continent.

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

96. *It is further recommended that the Secretary-General take steps to: ensure that an appropriate mechanism exists for the transfer of information on park legislation and planning and management techniques developed in some industrialized countries which could serve as models to be made available to any interested developing country.*

97. Ensure that the appropriate United Nations agencies 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.

Response: 95-97. The Advisory Committee concurs.

98. *It is also recommended that governments:*

(a) Take steps to co-ordinate and co-operate on the management of shared protected areas.

Agreement should be reached on such aspects as the rights of guards to follow poachers across international boundaries, 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.

Response: 98(a). The Advisory Committee concurs, and recommends that such agreement provide for recompensing for environmental damage occurring to a nation due to actions in another nation.

(b) Move to agree on the proposed conventions on *CONSERVATION OF CERTAIN ISLANDS FOR SCIENCE AND CONSERVATION OF THE WORLD HERITAGE*.¹

Response: 98(b) (1). While the concept of a convention on the Conservation of Certain Islands for Science merits serious consideration, present drafts are inadequate and final action would be premature at this time. The United States should support continuing negotiations after the Stockholm Conference. Such a convention should insure the environmental integrity of any included island from direct and indirect actions of the nation having jurisdiction. Covenants to insure proper management, protection, monitoring, and necessary enforcement provisions are required. The actions of nationals as well as all government agencies, including the military, should be covered by the convention. Finally, where islands are under the temporary jurisdiction of a nation, for example, under a U.N. mandate, the inhabitants, if any, of such islands should be included in the decision to place the island within the terms of the convention.

Response: 98(b) (2). Regarding the Conservation of the World Heritage the Advisory Committee disagrees. See Advisory Committee Recommendation 4A of this chapter.

(c) Take steps to set aside areas representing ecosystems of international significance for protection under international agreement.

Response: 98(c). The Advisory Committee concurs.

99. *It is recommended that interested governments—which have not yet done so—sign and ratify the CONVENTION ON CONSERVATION OF WETLANDS OF INTERNATIONAL IMPORTANCE, approved at the Conference of Ramsar (Iran).*

Response: 99. This convention, the present text of which was approved at a conference in Ramsar, Iran, should not be signed by the United States. In its present form, this convention is too narrow in scope and does not include adequate provisions to insure the protection of wetlands. In addition, the value of wetlands goes beyond providing water fowl habitat; they play a vital ecological role in the formation of climatic conditions, marine breeding, and provide nursery grounds among other roles. The United States should initiate the development of a more comprehensive treaty regarding wetlands, and should consider the incorporation of wetlands protection in a broader treaty governing national actions which affect international water resources.

D. The Conservation of Genetic Resources

(i) *Consideration for action* (omitted)

(ii) *Recommendations for action*

It is recommended that governments, in co-operation with the Secretary-General and FAO where indicated, take the following steps.

107. Agree to an international programme to preserve the world's genetic resources.

Active participation at the national and international levels is involved ;

- it must be recognized, however, that while survey, collection, and dissemination of these genetic resources is 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.

An international network is required with appropriate machinery to facilitate the interchange of information and genetic material among countries.

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

Action is necessary in six inter-related areas ;

- survey of genetic resources
- inventory of collections
- exploration and collecting
- documentation
- evaluation and utilization
- conservation

- conservation represents the crucial element to which all other programmes relate.

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

108. Make inventories of genetic resources most endangered by depletion or extinction.

All species threatened by man's development should be included in such inventories.

Special attention should be given to locating in this field those areas of natural genetic diversity which are disappearing.

These inventories should be periodically reviewed and updated by appropriate monitoring.

The survey conducted by FAO in collaboration with IBP is designed to provide information on endangered crop genetic resources by 1972, but will require extension and follow-up.

109. Compile or extend, as necessary, registers of existing collections.

Such a register should identify which breeding and experiment stations, research institutions and universities maintain which collections.

Major gaps in existing collections should be identified where material is in danger of being lost.

These inventories of collections should be transformed for computer handling and made available to all potential users.

In respect to plants:

- it would be expected that the "advanced varieties" would be well represented, but that the primitive materials would be found to be scarce and require subsequent action

- the action already initiated by FAO, several national institutions, and international foundations should be supported and expanded.

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

- a cataloguing of the large and small collections and the value of their holdings is required, rather than a listing of individual strains

- many very small but unique collections, sometimes the works of a single specialist, are lost

- governments should assure that valuable gene pools held by individuals or small institutes are also held in national or regional collections.

In regard to 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.

In regard to 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.

110. Initiate immediately, in co-operation with all interested parties, programmes of exploration and collection wherever endangered species have been identified which are not included in existing collections.

An emergency programme with the co-operation of the MAB programme, of plant exploration and collection should be launched on the basis of the FAO List of Emergency Situations for a 5-year period.

With regard to forestry species, in addition to the efforts of the Danish/FAO Forest Tree Seed Center, IUFRO, 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.

111. Conservation is a most crucial part of any programme of genetic resources programme. Moreover, major types of genetic resources must be treated separately because:

They are each subject to different programmes and priorities.

They serve different uses and purposes.

They require different expertise techniques and facilities.

112. Plant germ plasm—agriculture and forestry: organize and equip national or regional genetic resources conservation centres.

Such centres as The National Seed Storage Laboratory in the United States and the Vavilov Institute of Plant Industry in the USSR already provide good examples.

Working collections should be established separately from the basic collections;

- these will usually be located at plant breeding stations and will be widely distributed.

Three classes of genetic crop resources must be conserved;

- high-producing varieties in current use and those they have superseded

- primitive varieties of traditional pre-scientific agriculture (recognized as genetic treasures for plant improvement)
- mutations induced by radiation or chemical means.

Species contributing to environmental improvement, such as sedge used to stabilize sand-dunes, should be conserved.

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.

113. Maintain gene pools of wild plant species within their natural communities.

It is therefore 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 desirable.

Species of medical, aesthetic, or research value should be insured.

The network of biological reserves proposed by UNESCO (MAB) should be designed, where feasible, to protect these natural communities.

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.

114. Fully implement the programmes initiated by the FAO panels of experts on forest gene resources in 1968 and on plant exploration and introduction in 1970.

115. *Animal germ plasm*: consider the desirability and feasibility of international action to preserve breeds or varieties of animals.

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 co-operation with governments would be necessary, however
- IUCN might logically be given responsibility for wildlife, in co-operation with FAO, MAB (UNESCO), and governments.

Any such effort should also include research on how to preserve, store, and transport germ plasm.

Specific methods for the maintenance of gene pools of aquatic species should be developed.

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

116. *Micro-organism germ plasm*: Co-operatively establish and properly fund a few large regional collections.

Full use should be made of major collections now in existence;

- no new centres should be contemplated in the developed world until those existing achieve regional significance.

Although 19 major centres exist in the developed world, none can be found in developing countries;

- to provide geographic distribution and access to the developing nations, regional centres should be established in Africa, Asia, and Latin America.

117. Establish conservation centres of insect germ plasm.

The very difficult and long process of selecting or breeding insects conducive to biological control programmes can only begin in this manner.

118. Evaluation and utilization are critical corollaries to the conservation of genetic resources.

In respect to crop breeding programmes, it is recommended that governments give special emphasis to

- the quality of varieties and breeds and the potential for increased yields
- the ecological conditions to which the species are adapted
- the resistance to diseases, pests and other adverse factors
- the need for a multiplicity of effort so as to increase the chances of success.

119. Collaborate to establish a global network of national and regional institutes 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.

Facilities should be designed to assure the use by

- breeders, to develop varieties and breeds both giving higher yields and having higher resistance to local pests and diseases and other adverse factors
- users, providing facilities and advice for the safest and most profitable utilization of varieties and breeds most adapted to local conditions.

Such co-operation would apply to all genetic resource conservation centres and to all types mentioned above.

Standardized storage and retrieval facilities for the exchange of information and genetic material should be developed;

- information should be made generally available and its exchange facilitated through agreement on methods and technical standards
- international standards and regulations for the shipment of materials should be agreed upon
- basic collections and data banks should be replicated in at least two distinct sites, and should remain a national responsibility
- standardized and computerized system of documentation is required.

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 programmes.

120. The need for liaison among the parties participating in the global system of genetic resources conservation requires certain institutional innovations.

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

- improve liaison between governmental and non-governmental efforts
- assist in the liaison and co-operation between national and regional centres with special emphasis on
 - international agreements on methodology and standards of conservation of genetic material
 - standardization and co-ordination of computerized record systems
 - exchange of information and material between these centres
- assist in implementing training course in exploration, conservation and breeding methods and techniques
- act as a central repository for copies of computerized information on gene pools (discs and tapes)

- 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

- plan and co-ordinate the five-year emergency programme on the conservation of endangered species

- further assist governments, wherever required, to implement their national programmes

- promote the evaluation and utilization of genetic resources at national and international levels.

It is recommended that the appropriate United Nations agency initiate the required programme on micro-organism germ plasm;

- periodic international conferences involving those concerned with the maintenance and research on gene pools of micro-organisms should be supported

- such a programme might interact with the proposed regional culture centres by

- assuring that each centre place high priority on the training of scientists and technicians from the developing nations

- acting as a necessary liaison

- lending financial assistance to those countries established outside the developed countries

- 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

- study should be particularly conducted on waste disposal and recycling, controlling diseases and pests, and food technology and nutrition.

It is recommended that FAO institute a programme in respect to 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.

It is recommended that the MAB project on the conservation of natural areas and the genetic material contained should be adequately supported.

Response: 107-120. The Advisory Committee concurs.

E. Fisheries

(i) *Considerations for action* (omitted)

(ii) *Recommendations for national action*

It is recommended that governments give consideration to the following proposals:

126. Research should be strengthened relating to:

The functioning of aquatic ecosystems and their productivity.

Transplantation of non-native species to new habitats and their acclimatisation; conducting of suitable tests on controlled conditions to achieve this.

The basic physical, chemical, and biological processes of dilution, dispersal and decomposition of wastes and concentration of pollutants in the aquatic environment, especially in inshore waters.

The effects of pollutants on aquatic resources and ecosystems including the sub-lethal effects (see Subject Area III paper).

The effects of major man-made modifications of the river flows and of water movements in coastal areas.

The treatment of waste waters to prevent the discharge of toxic and other undesirable substances in the aquatic environment.

The use of aquaculture especially to recycle and conserve the resources present in domestic wastes particularly where there is a concurrent protein shortage, developing safeguards against the transmission of pathogens and pollutants to man.

Response: 126. The Advisory Committee concurs, and urges particular emphasis on research in aquaculture.

127. Surveys and monitoring activities should be developed.

Collection of data on catch state of resources and fisheries activities should be improved in order to provide a more reliable and accurate basis for the assessment of fish stocks, their management and fishery development activities.

This information should be closely associated with data on the environment including that provided by the monitoring of pollutants in the aquatic environment. (See Subject Area III paper)

Response: 127. The Advisory Committee concurs, and suggests that the international monitoring be carried out by independent parties.

128. Overall development policies and plans should take due account of the increasing role of fisheries in world food supply and of their vulnerability to multiple forms of damage by other development activities, particularly those affecting productive coastal areas.

Ecologically and economically valid interest of fisheries should be protected accordingly.

129. In order to further enlarge the protein harvest from the hydrosphere the productivity of the aquatic resources should be protected and enhanced by:

Rational management of fish stocks through implementing appropriate regulatory controls based upon monitoring and periodic assessments of fish stocks and catches.

Diversifying fisheries within the large resources of the hydrosphere.

Developing aquaculture.

Controlling the discharge of toxic wastes.

Using and recycling some of the non-toxic wastes for aquaculture.

Preventing and/or reducing the harmful consequences of man-made modifications of fresh water bodies and coastal areas.

Exerting a careful control on the conditions governing the transfer and introduction of exotic fish species.

130. The following action requirements should be considered:

The required research institutions and related training facilities should be established or strengthened to implement action proposals presented in para. 7 above, and to allow effective participation in the activities of the regional and international fisheries bodies.

Fisheries institutions should be adequately supported to undertake required environmental and biological research and to provide necessary data on catches, state of resources and fisheries activities and make periodic assessment of fish stocks. These institutions should closely collaborate with those in charge of monitoring water pollution.

The exchange of information relating to aquaculture introducing of exotic species, as well as the exchange of expertise in these fields should be fostered.

Fisheries legislation and regulatory control institutions will need to be reviewed and their effectiveness improved to cope with increasing demand for protecting fisheries. The training of specialists for these fields will be necessary, as will the provision of adequate resources and facilities.

Response: 128-130. The Advisory Committee concurs.

(iii) *Recommendations for international action*

It is recommended that governments, and the Secretary-General in co-operation with FAO and other UN organizations concerned, as well as development assistance agencies take steps to:

131. Support recent guidelines, recommendations, and programmes of the various international fishing organizations.

A large part of the needed international action has been identified with action programmes 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:

- co-operative programmes such as that of LEPOR (Long-Term and Expanded Programme on Oceanic Research), GIPME (Global Investigation of Pollution in the Marine Environment) and IBP (International Biological Programme)
- exchange of data, supplementing and expanding the services maintained by FAO and bodies within its framework in compiling, disseminating and co-ordinating information on living aquatic resources and their environment and fisheries activities
- evaluation and monitoring of world fishery resources, environmental conditions, stock assessment, including statistics on catch and effort, and the economics of fisheries
- assistance to governments in interpreting the implications of such assessments, identifying alternative management measures, and formulating required actions
- special programmes 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
 - historically the need for management action to be nearly unanimous has reduced action to the minimum acceptable level.

Response: 131. The Advisory Committee basically concurs, but suggests modification of existing institutions to provide a more coordinated approach to operations affecting fisheries resources.

132. Ensure close participation of fishery agencies and interests in the preparations for the UN 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.

133. Ensure international co-operation in the research, control, and regulation of the side effects of national activities in resource utilization where these affect the resources of other nations.

Estuaries, inter-tidal marshes, and other near-shore and inshore 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.

Discharge of toxic chemicals, heavy metals, and other wastes may effect even high seas resources.

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

134. Further develop and strengthen facilities for collecting, analyzing and disseminating data on living aquatic resources and the environment in which they live.

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

It is clear that a much greater range of biological parameters must be monitored and analyzed 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 the needs of this expanding need for data.

Full utilization of present and expanded data facilities is dependent on co-operation 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.

135. Ensure full co-operation 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, encourage the establishing of fishery councils and commissions as appropriated.

The operational efficiency of these bodies will largely depend on the ability of the participating countries to carry out their share of the activities and programmes.

Technical support and servicing from the specialized agencies, in particular from FAO, is also required.

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

Response: 132-135. The Advisory Committee concurs.

F. Water

(i) *Consideration for action (omitted)*

(ii) *Recommendations for national action*

It is recommended that national governments give consideration to the following proposals:

151. Governments should establish, where this has not yet been done, an integrated institutional framework for water resources management and development.

The institutional framework should include appropriate institutions (agencies, authorities, institutes, boards, councils, etc.) of nationwide as well as of regional and local competence;

- in the subdivision of the responsibilities, among areas, due attention should be paid to the boundaries of the national hydrological regions (river basins, lake basins, groundwater systems)
- the institutional framework should not be subordinated to any of the agricultural or industrial departments representing only one or a group of the water management fields.

The institutional framework should be structured and staffed for the execution or supervision and co-ordination of the following principal functions:

- legal and fiscal administration in all the fields of water management relevant under the conditions of the country. This includes:
 - providing affected parties the opportunity to have a voice in decisions
 - granting rights and issuing licenses, permits, or concessions
 - provision that externalities associated with waste discharge be accounted for
- operation of water supply and water management systems
- water resources development planning.
- construction and maintenance of water management projects and structures
- data acquisition and research.

Allocation of water as to amount, quality and timing should be centralized at the national and regional levels in planning as well as in operational decisions.

Structure and procedures should be established assuring an equitable co-operation with other branches of the national administration at appropriate levels.

152. Governments should undertake, where necessary, comprehensive surveys of water resources and water demands.

The surveys should include:

- the assessment of the actually and potentially available fresh water resources with due attention to
 - the availability of hydrological, meteorological and hydrogeographical data and inventories
 - the interdependences among the water resources of the adjacent regions as well as among the different types of the water resources (rivers, lakes, groundwaters)
 - the opportunities of augmenting the available resources by storage, reservoirs, artificial recharge of groundwaters, watershed management and other measures
 - the quality and time distribution of the available resources
- the assessment of the actual water uses and expected future water requirements whereby
 - particular attention should be paid to domestic and public water supply
 - elasticity of the industrial and agricultural water requirements should be considered
 - quality requirements and polluting effects should be identified.

- an integrated evaluation of the resources and demands with due attention to
 - the opportunities of balancing the discrepancies in the distribution of their time and area
 - the possibilities of multiple use of water
 - flood control
 - pollution control and other environmental effects.

Major changes in the water uses should be registered on an annual basis and the comprehensive surveys should be renewed periodically in order to detect inevitable changes in water distribution and quality.

The results of the surveys should be evaluated also in the broader contexts of co-operation with neighboring countries.

153. Governments should formulate and adopt integrated water resources policies.

The national water resources policy should be based on the results of the surveys of water resources and demands and it should identify

- the basic principles and fundamental procedures under which water is managed and developed
- the basic approaches in assuring the proper place and role of water management in the general national and regional planning and development
- the interests and potential roles of the country in the broader context of the bilateral, multilateral and international issues of water resources development.

All funding should be done on the basis of comprehensive national or regional plans, and individual projects supported only within the framework of such plans;

- treatment facilities can thereby be combined and economies of scale achieved
- priorities can be assigned by identifying areas of greatest need.

Price mechanisms including effluent charges and other economic measures should be used where appropriate to stimulate more efficient use of water.

The necessary legal and legislative adjustments to conform to such a policy should be effected.

All social and cultural factors, including public participation, should be provided for.

A multidisciplinary team should be assembled to undertake the necessary planning and management.

154. Governments should give special attention to pollution control and other environmental aspects of water resources management.

Pollutants of special concern are toxic industrial wastes, chemicals including heavy metals, and bacterial contaminants and viruses.

Various independent activities, such as uncontrolled deforestation or land reclamation should also be viewed with a concern for water quality.

Local, regional and national water quality monitoring systems should be established, where appropriate, to prevent damages from unexpected pollution.

Systems of national environmental impact statements should be developed and introduced as organic parts of the national water resources planning regulations.

155. Governments should encourage the increased efficiency of water use in agriculture and in industry.

Existing networks of irrigation, drainage, and water management practices, at the farm level, should be improved to

- increase yields of crop and grazing lands.
- avoid losses of water, soil and plant nutrients by runoff and percolation, thus reducing the hazards of water pollution and of soil degradation by erosion, salinization and water-logging.

Increased efficiency should be achieved in order to

- save water enabling further extension of the existing water supply systems
- reduce the spread of water-borne diseases.

Water saving programmes could be introduced and stimulated by

- promoting closer co-operation between the water supplying and water using agencies and undertakings
- the application of price-systems reflecting real costs of water supply and pollution control.

156. Governments should engage in the acquisition of new knowledge and co-operate in the transfer of existing knowledge, as priorities indicate.

Technology exists to treat water to prevent the transmission of bacterial diseases, although more knowledge is needed about the removal of more complex contaminants and, in particular, viral organisms.

Technology exists for the removal of specific contaminants from point sources, for economically treating municipal wastes for the efficient removal of suspended and dissolved solids and for preventing increases in biochemical oxygen demand loadings;

- however, the operation of systems for handling residues from a number of dispersed sources and their common treatment is not too well understood due to the complex and unrelated varieties of the disposal sources.

Technology exists to provide tertiary treatment of wastes to remove nutrients and dissolved solids, among other things, but in many cases this degree of treatment is not economically acceptable depending on the quality reached in the treatment process and that demanded by the consumers.

Systems analysis techniques are well developed but their application to water resources management problems has been limited because of the lack of knowledge about the varieties components of the system as they apply to water problems. These are

- identification of new parameters for evaluating the social and economic values that are essential for making the best choice among alternatives.
- development of various type institutional arrangements to facilitate water resource management on a national and international basis.

Technology exists to recover waste products for recycling, but more efficient methods of removal and recovery are frequently needed to make such practices more economical. Moreover, technologies are needed which decrease the demand on water.

Technology exists for the recharging of groundwater and for deep well disposal, but more knowledge is required on leaching effects and the behaviour of groundwater.

Isotope techniques provide a new and often cheaper tool to study the inter-relationships of lakes and groundwater, different aquifers, areas of recharge, and groundwater flow.

Other major gaps in knowledge include :

- prevention of water losses by runoff, evaporation and percolation effects of irrigation and drainage on the environmental, management and efficient use of soil water
- use of water of poor quality and re-use of water by industry and in agriculture
- improved water recycling techniques for various industrial uses
- development and management of groundwater resources, particularly in relation to surface waters and including consideration of the selective transport of pollutants through underground aquifers
- improved management of water where it falls, including the development of improved techniques in rain-fed agriculture
- management of water for fisheries developments
- development of water quality indices, which could note trends and upon which policy decisions could be taken (as are economic decisions on the basis of GNP)
- long-range toxic effects of certain metals and of new synthetic organic substances that persist in the receiving water even after conventional treatment and that are stable to biological attack
- improvement in methods and procedures to identify and measure the presence of toxic metals, organic chemicals, and other contaminants in water
- the action, under various conditions, of oxidation ponds and other cheap methods of waste treatment, and the use of such procedures for the treatment of industrial wastes
- the institutional aspects of water quality control
- the management rather than the analytical techniques for planning
- the relationship between water quality control and bathers' health
- the environmental impacts of water development projects

Many other research needs can be readily identified but cannot be included here.

Each nation should carefully identify its research priorities :

- those countries with relatively undeveloped resources should focus on applied studies of the more practical kind, development oriented, and related to local resources and manpower skills
- those countries with more advanced management capabilities should focus on more fundamental investigations requiring more sophisticated skills and physical as well as financial resources.

157. Governments should support formal and short-term training courses essential to the development of effective water management programmes.

Courses should be initiated that will permit the updating of current staff in techniques and methodologies being developed.

Governments should encourage those seeking training in industrialized countries to concentrate their efforts, particularly any research studies, on problems relevant to their own countries' needs.

Governments should support the creation within their academic institutions of interdisciplinary courses and degrees on unified water planning and management

- the traditional sectors of sociology, engineering, economics, agronomy, ecology, etc. must be combined and fitted to the new needs of integration.
- The inadequate number of sewage treatment operators, familiar with the increasingly sophisticated facilities, must be remedied by training courses.

158. Governments should encourage the translation of laboratory investigations to field practice.

The exchange of personnel between operating and research agencies.

The funding of investigations by operating agencies.

Having operating agencies participate in decision-making on study programmes.

Response: 151-158.—The Advisory Committee concurs.

(iii) Recommendations for international action

159. It is recommended that governments concerned consider the creation of appropriate multinational institutions in the form of international river-basin commissions, for water resources common to more than one jurisdiction.

Full consideration should be given to the sovereign rights of each country concerned to develop its own resources.

The following principles should be upheld :

- that nations agree that when water resource activities are contemplated that may have an environmental effect on another country, the other country be notified well in advance of the activity envisaged
- that the basic objective of all water resources use and development activities is to provide maximum net benefits to the combination of all nations affected by such activities
- that the net benefits of hydrologic regions common to more than one national jurisdiction are to be shared equitably by the nations affected. Such arrangements will permit undertaking on a regional basis;
- collection, analysis, and exchange of hydrologic data through some agreed upon international mechanism
- joint data-collection programmes to serve planning needs
- assessment of environmental effects of existing water uses
- 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
- co-operative management, including a programme of quality control, of water resource as an economic asset
- provision for the judicial and administrative protection of water rights and claims
- prevention and settlement of disputes with reference to equitable apportionment and conservation of water resources
- financial and technical co-operation of a shared resource.

Regional conferences should be organized to promote the above considerations.

Response: 159.—The Advisory Committee concurs.⁹

160. It is recommended that the Secretary-General take steps to:

(a) Ensure that appropriate United Nations Bodies support government action where required;

• reference is made to FAO, WHO, WMO, ESA/RTD, and the regional economic commissions. For example

- the first 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

⁹ See Advisory Committee Recommendation 7. of this chapter.

- the second has available the International Reference Centre for Waste Disposal located in Dübendorf, Switzerland and the International Reference Centre of Community Water Supply in the Netherlands

- the third has a Commission on Hydrology which provides guidance on data collection and establishment of hydrological networks

- the fourth has established the United Nations Water Resources Development Centre

- similar specialized centres should be established at regional level in developing countries for training, research and information exchange on

- inland water pollution and waste disposal in co-operation with WHO, FAO and regional economic commissions of the United Nations

- water management for rain-fed and irrigated agriculture, by FAO in co-operation with the regional economic commissions

- integrated water resources planning and management in co-operation with ESA/RTD and the regional economic commission.

(b) Ensure that the United Nations system is prepared to provide technical and financial assistance to governments when requested in the different functions of water resource management.

Surveys and inventories.

Water resources administration and policies, including

- establishment of institutional frameworks
- economic structures of water resources management and development
- water resources law and legislation.

Planning and management techniques, including

- assignment of water quality standards
- implementation of appropriate technology
- more efficient use and reuse of limited water supplies.

Basic and applied studies and research.

Transfer of existing knowledge.

Continuing support of the programme of the International Hydrological Decade.

(c) 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 choice of alternatives.

(d) Prepare a comprehensive assessment and evaluation of the actual and potential environmental effects of water management upon the oceans.

The oceans are the ultimate recipient for the natural and man-made wastes discharged into the river systems of the continents.

Changes in the amount of riverflow 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.

Response: 160(a)-(d). The Advisory Committee concurs.

G. Mining and Primary Mineral Processing

(i) *Considerations for action (omitted)*

(ii) *Recommendations for national action*

It is recommended that national governments give consideration to the following proposals.

167. Countries should adopt the view that most mineral exploration and production are parts of a series of sequential land uses. This view should be integrated with other aspects of the country's natural resource management plans.

168. Each country should develop firm policies appropriate to its goals and environmental concerns.

These policies should cover:

- minimum environmental standards for each set of environmental conditions and
- special considerations that may modify the general standards
 - particular features, such as national parks
 - particular goals, such as the preservation of a rural society, or, conversely, the development of a planned mining region.

These policies should be clearly set out in advance so that they become a force to which mineral proposals respond rather than be developed as a reaction to such proposals.

These policies should also seek to add costs of environmental damage to production costs, so that producers will be encouraged to seek less damaging processes.

In addition, they should be rooted as firmly as possible in each country's legal and institutional framework rather than relying on ad hoc measures.

169. Countries should develop land-use regulations that will permit mineral extraction, and subsequent mined-land reclamation, prior to the advent of other economic activity that would preclude mining, except for those cases where mining would destroy other resources deemed to be of greater aesthetic, cultural, or economic value.

170. Each nation should vest its proposed land use agency with the authority to implement the preceding recommendations.

With a single agency, there is more likelihood of an integrated approach rather than the mere transfer of problems from one domain to another.

Each country should consider the advantages of granting this agency some degree of autonomy from mining interests, be these governmental or private.

171. Furthermore governments should

Establish base lines of natural activity and monitor changes in actual and potential mining areas so that the impact of mining can be measured—and eventually predicted.

Redirect part of their often extensive mining research programme to develop mining and processing methods that will avoid or reduce these impacts during mining, to determine how to stabilize waste disposal sites, and to search for ways in which the wastes can be put to beneficial use.

Response: 167-171.—The Advisory Committee concurs.

172. Countries should adopt the standard of no new incidence of advanced cases of occupational lung disease and set up systems for early diagnosis of the disease.

Response: 172.—The Advisory Committee concurs, but holds that this recommendation should be stronger and require the use of the best available technology to insure maximum mine health and safety.

173. Countries should adopt reclamation standards and regulations to the effect that all exploration activity and all mining be completed in such ways that there are no continuing damages.

174. Nations should study means to increase the recycling of mineral-based products and, wherever justified by a consideration of the comparative costs, encourage recycling processes.

Response: 173–174.—The Advisory Committee concurs.

(iii) *Recommendations for international action*

175. *It is recommended that* the Secretary General provide the appropriate vehicle for the exchange of information.

Improved accessibility and dissemination of existing information is required ;

- the body of literature and experience is already larger than one would think.

Possibilities include the accumulation of information on :

- the environmental conditions of mine sites
- the action taken in respect to the environment
- the positive and negative environmental repercussions.

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 reclamation costs will be particularly high, or where other problems will arise.

Response: 175.—The Advisory Committee concurs.

4. Energy

(i) *Consideration for action (omitted)*

(ii) *Recommendations for national action*

It is recommended that national governments give consideration to the following proposals.

189. Each nation should set up a national energy board to coordinate energy development and utilization policies, staffed with highly qualified personnel, including some in those disciplines relating to the adverse environmental effects of energy.

If such a national agency is not feasible it is recommended that each nation adopt a coordinated energy policy, so as not to forget environmental considerations ;

- this is all too often the result when there are competing single-purpose agencies, each responsible for a different form of energy
- coordination will also have other benefits.

190. Those governments with high per capita use should consider the opportunities for reducing the growth of energy consumption as one of the alternatives in minimizing all of the costs—direct, environmental and cultural—from economic development.

191. Countries should also develop explicit transportation policies and integrate these with considerations developed above.

192. Countries should promote economic and technological research capabilities for developing or assessing new energy systems or for determining the best or improved use of existing systems.

Within industrial nations, this effort should take place on a large scale and include basic research programmes that have no short-run returns but involve desirable long-term reorientation;

- it is important that the implications to energy consumption of product substitution be examined
- research and development of new conversion processes should receive high priority
- the effort to determine the technological feasibility of fusion power should be strongly supported in order to see whether development is merited.

In developing nations, the focus should be more on the solution of their particular energy constraints, generally by highly applied research on practical problems;

- countries should study the alternatives in order to determine the most appropriate combination of systems for different uses.

In either case, as emphasized above, careful technological assessments must be made of the environmental impacts of any proposed change in energy economics or technology.

193. Countries should devote special attention to minimizing environmental impacts when siting energy production, conversion and transportation facilities.

Appropriate review and appeal procedures should also be established.

194. Each nation should also set up or, if they already exist, review the effectiveness of agencies to administer minimum standards in areas where accidents must be controlled.

Because of the possible conflicts, the functions of promoting and regulating each source of energy should be vested in separate agencies.

195. Despite best efforts, a finite probability of accidents must remain. For this reason, each nation may wish to set up a pollution crisis centre to deal with accidents.

Such a centre need only be a "skeleton organization" but must have strong communications links and the authority to command what it needs to cope with accidents and prevent damage from spreading.

Equipment not readily available should be held on reserve in high-risk areas for mobilization during such accidents.

Response: 189-195.—The Advisory Committee concurs.

(iii) *Recommendations for international action*

196. It is recommended that the Secretary General take steps to:

(a) Ensure proper collection, measurement and analysis of data relating to the environmental effects of energy use and production within appropriate monitoring systems.

The design and operation of such networks should include, in particular, monitoring the effects of emissions of carbon dioxide, sulphur dioxide, heat, and particulates, as well as the effects of releases of oil and radioactivity;

In each case the objective is to learn more about the effects on weather, human health, plant and animal life, and amenity values.

(b) Give special attention to providing a mechanism for the exchange of information.

Clearly, to rationalize and integrate resource management for energy will require a solid understanding of the complexity of the problem and the multiplicity of alternative solutions.

Access to the large body of existing information should be facilitated;

- data on the environmental consequences of different energy systems should be provided through an exchange of national experiences, studies, seminars, and other appropriate meetings

- a continually updated register of research involving both entire systems and each of its stages should be maintained.

(c) Ensure that a study be undertaken on available energy sources and consumption trends in order to plan for and forecast the environmental effects of future use.

Response: 196(a)-(c).—The Advisory Committee concurs.

Subcommittee 2

Environmental Aspects of Natural Resource Management

Governor James Carter, Chairman, of Georgia

Mr. Joseph L. Fisher
President, Resources for the Future
Mr. Denis Hayes
Environmental Action
Woodrow Wilson International Center for Scholars
*Mr. Sidney Howe
President, Conservation Foundation
Mr. George Taylor, Secretary
AFL-CIO Committee on Atomic Energy & Natural Resources

Mr. Aubrey Wagner
Chairman of the Board, TVA
Mrs. Thomas Waller
Member, Board of Governors
The Nature Conservancy
Gordon K. Zimmerman, President
National Association of Conservation Districts

Subcommittee Director

Kenneth C. Tapman

*Did not participate in final deliberations.

3. Pollutants

Identification and Control of Pollutants and Nuisances of Broad International Significance

INTRODUCTION

The establishment of a reliable worldwide system of environmental monitoring would be one of the most important, substantive achievements of the Conference on the Human Environment. And we believe that it merits the highest priority of the American delegation to the Conference on the Human Environment. The workings of the Earth's oceans and atmosphere are mysterious, and the effects of the substances man puts into them are poorly understood; baseline data are lacking in nearly all areas of present concern, and where such data are available the significance of known changes is in dispute.

Our ignorance has a paralyzing effect on the development of environmental policy. The most confidently documented predictions of apocalypse are likely to go unheeded when equally confident, but wholly inconsistent, predictions are available—the world cannot at once end in the melting of the ice caps and the beginning of a new ice age. Even in the most industrialized nations, where concern for environmental quality is greatest, public support for measures which will have real and often substantial costs is unlikely to be sufficient for their adoption until the public and officials who make decisions on its behalf, have a clearer idea than is presently possible of the nature of the problems it faces and why the proposed measures are necessary.

More and better information will not, of course, guarantee more effective environmental policies. Increased knowledge rarely sweeps doubt and uncertainty aside; more often it simply sharpens them.

Even when facts speak unequivocally, policy dilemmas remain—witness the continuing dispute over the use of DDT in less developed and tropical regions. But more reliable information is obviously necessary even if not it does not solve the dilemmas. DDT is both the best understood global pollutant and the one for which policy is most advanced. Other matters which may be even more critical to our globe's long-run prospects than DDT, such as the effects of pollution in the upper atmosphere and oil on the surface of the seas, are so little understood that productive policy debate itself is difficult.

The Committee has conducted extensive public hearings as well as individual interviews with members of the scientific community, and we are satisfied that the current United Nations proposals for agenda item III (The Identification and Control of Pollutants of International Significance) promise an excellent start toward the needed global monitoring system. While we feel that our specific recommendations are important, in truth they represent only marginal additions to the ambitious United Nations proposals.

A few preliminary notes of caution are in order. First, funding must be sufficient not only in amount but in duration. Gathering baseline data on the global dispersion of pollutants, studying the interlocking processes (atmospheric, oceanic, terrestrial) that both transport and, in turn, are transformed by these pollutants, and developing a predictive capability by the use of computer modelling are long-range ventures that will not yield immediate results. Particularly in regard to climatic change several decades of concerted scientific effort will be required. Expenditures in these areas should be considered as insurance by the human race against the possibility of rendering the planet unfit for life, rather than as an investment promising rapid, large-scale returns.

Our second concern stems from the many functions that have been suggested as the subject matter of this network. Beyond studying man's impact on the environment, many scientists would like to collect a staggering amount of data for a variety of basic research projects. Others would like the monitoring network to collect data for resource management, give early warnings of natural disasters, and provide day-to-day information on weather and ocean conditions for sailors, pilots, farmers, and sportsmen. Much of this information can be easily gathered at the same location with compatible instrumentation. But there will be times when these uses will prove incompatible as to location and instrumentation. It is essential that when choices, forced by budgetary constraints, must be made between competing uses, the highest priority should be given to those uses that are concerned with the impact of man's activities on the quality of the environment. The

spectre of man irrevocably degrading the planet is the prime motive for the Conference on the Human Environment, and the need to fully assess the validity of this fear should take precedence in the implementation of a global monitoring network.

Man's profound ignorance of basic ecological phenomena is likely to persist far into the future. Yet decisions with important environmental consequences do not wait for scientific consensus. Since calls for "more research" are often interpreted as means of postponing substantive action, we hope that the nations assembled at Stockholm will go beyond the United Nations recommendations, which call upon participants to be "especially mindful" of the possible environmental harm from planned projects and to use the "best practicable means" for minimizing that harm. Instead, we urge explicit acknowledgement of this principle: that when faced with decisions regarding the development of new technologies with uncertain but potentially damaging environmental consequences, uncertainties ought to be resolved in favor of caution and postponement. Where large scale, irreversible damage threatens, as in the discharge of new or exotic materials into the oceans and upper atmosphere, the importance of this principle is especially great.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE

1. A strong, high-level executive for environmental affairs, with broad terms of reference, should be established in the office of the Secretary-General of the United Nations.¹

A. Terrestrial monitoring should be given a high priority, and plans to establish terrestrial baseline stations should be initiated.

B. The data collected by the International Decade of Ocean Exploration (IDOE) under its global sampling program should be utilized to initiate plans for ocean baseline stations.

C. Programs for the study of the crucial Ocean-Atmosphere and Atmosphere-Land interfaces should be begun.

D. Land-use surveys, utilizing satellites and airplanes with remote sensing devices should be initiated.

E. Studies of rainfall for critical pollutants should be initiated.

F. Standards for monitoring techniques and for reporting information and data to the International Information Systems should be established to ensure coordination, compatibility, and completeness. Industrial data needed for assessment, review, and predictive studies should be considered an integral part of these reporting requirements.

¹ See Chapter VI, Advisory Committee Recommendation 1.

G. A clearing house for computer programs (software) should be established.

H. A standard-setting capability in the United Nations environmental office should be established.

2. Interdisciplinary scientific advice should be institutionalized.²

3. Periodic reporting requirements for both the United Nations and advisory bodies should be established.

4. Discussions, designed to ensure that all nations are free to conduct oceanic research, the results of which would be available to the international scientific community, should be initiated.

5. Adoption of the Ocean Dumping Convention, in its present form, should have a low priority at the Conference on the Human Environment in June 1972.³

DISCUSSION OF THE RECOMMENDATIONS

1. Creation of a Strong, High Ranking Environmental Executive Office in the United Nations

Existing monitoring programs are scattered throughout specialized national and international agencies. Although these existing programs will continue to serve as the field components of a global monitoring program, there is a need for a central focal point to provide leadership and coordination, initiating new research programs where needed and eliminating redundant ones. Sounding the clarion call for new research and monitoring programs is something easily done, but extremely difficult to implement. Special care must be taken not only to weld the components into an integrated network at the outset, but to insure that the various components grow in concert. A point of central cognizance is essential to minimize such problems as the proliferation of indigestible data, computers that refuse to "talk" to each other, and the bureaucratic in-fighting which have characterized past monitoring efforts.

A. Upgrading Terrestrial Monitoring and Establishing Terrestrial Baseline Stations

The one area where the Advisory Committee found consistent dissatisfaction among scientists was in the area of terrestrial monitoring. Although UNESCO's Man and the Biosphere (MAB) research program has been tabbed by United Nations proposals as the vehicle for terrestrial monitoring, its current prospects are in jeopardy because

² See Chapter VI, Advisory Committee Recommendation 6.

³ See Chapter II, Advisory Committee Recommendation 7.

of disputes over funding, coordination and priorities.⁴ The Committee finds this especially disturbing, since the critical step in evaluating the stress that critical pollutants are placing on the biosphere is determining their impact on living organisms. By monitoring life systems, man gains early warning of new pollutants and is able to determine whether essential ecosystems and their living components are being threatened, even if the direct health impacts on man have yet to be assessed. Man may be able to survive the onslaught of certain persistent chemicals, but certain marine organisms, birds, and now lower order mammals are showing they cannot.

We, therefore, strongly urge that the terrestrial monitoring be declared a priority item and that plans be initiated for the establishment of terrestrial baseline stations. Some proposals have called for these stations to surround the proposed atmospheric baseline stations. We endorse this where possible, but would add the caveat that this multiple use of a single site may not adequately serve the positioning requirements of both programs.

B. Utilize the data collected by the International Decade of Ocean Exploration sampling program to establish oceanic baseline stations

The scientific community has consistently admitted ignorance on the problem of where to locate oceanic baseline monitoring stations. But just as regularly, it has recommended an intensive global sampling program to determine sources and pathways of pollutants reaching the oceans. This program has been carried out recently by the IDOE, and the results are to be presented at a workshop in May, 1972. We strongly urge that the U.S. delegation carefully evaluate the results of these surveys and initiate discussions at the Stockholm Conference for the establishment of oceanic baseline stations.

C. Ocean-atmosphere, atmosphere-land interfaces

Although the problems of the ocean-atmosphere interface and of carbon dioxide buffering between the atmosphere and the biosphere are both identified as subjects for research in the Conference secretariat papers, no recommendations on these problems are offered. This is unfortunate, as these problems have been identified as being of great import in any attempt to enhance man's ability to understand the global forces that determine climate. The problem with both these areas is that they are interdisciplinary and cross media. The current scientific approach by media (air, land, and water) is not equipped to handle them. Science is just beginning to understand the entire land-

⁴ The IWG report on surveillance and monitoring also identifies FAO as a potential participant in terrestrial monitoring, but they are not mentioned in the final United Nations Proposals.

ocean-atmosphere complex as a single unified system with a myriad of interacting feedback relationships. When the rainfall in Tennessee can be correlated with temperatures in the mid-Pacific, we begin to realize that we are at the mercy of complex global forces we little understand. Obviously, there is work here for a generation of scientists. Unfortunately, this may be about all the time we have before the world community might have to make some very difficult control decisions regarding the impact of man's activities on the world climate. We think it essential that these problems not only be identified, but that organizational and administrative responsibilities be clearly delineated at an early stage.

D. Land-use surveys by airplanes and satellites (remote sensing devices)

Neither land-use surveys nor the use of remote sensing devices are mentioned in the United Nations proposals for Agenda Item III. Land-use is of concern because of its relationship to soil fertility, soil erosion, and the extension of arid zones. Also, land-use is important to those studying climatic change since land-use patterns effect the earth's thermal balance by altering the reflectivity of solar radiation and by changing evaporation patterns.

The ideal instruments for such land utilization surveys are satellites and airplanes; they also are capable of providing valuable information for the study of the atmosphere and the ocean. The omission of both land-use surveys and remote sensing devices from the United Nations recommendations appears to have resulted from their political sensitivity. Land-use is felt to be a matter of national concern, while remote sensing devices raise problems of national security along with the possibility that hidden reserves of valuable natural resources will be discovered by others and become the objects of foreign exploitation. These are sticky issues for which the Committee has no easy answers. We do feel that the international community has a legitimate interest in such data. We, therefore, urge that the United States support the use of satellites in gathering data where there are strong guarantees that such data will become the province of the international community.

E. Studies of rainfall for critical pollutants

Studying rainfall for such pollutants as heavy metals, petroleum products, and organochlorine compounds would be an inexpensive way of obtaining vital data as to the atmospheric pathways to the oceans of these pollutants. The International Atomic Energy Agency already analyzes rain for radioactivity. These efforts need only be expanded to include analysis for other pollutants. We feel, given the

modest effort required in establishing such a program, that a precipitation study program should be established as part of the global monitoring system.

F. Standardization of monitoring techniques and reporting formats.

The need to standardize monitoring techniques is axiomatic to a global monitoring network. Currently many different techniques are used to monitor for various pollutants, causing the results of such efforts to be the subjects of continual dispute. A global network must standardize these sampling techniques, and the frequencies at which they are taken, if the resulting data is to have any utility.

The rationale of reporting standards parallels that for monitoring standardization. The data that is sent to the information centers for assessment must be in some digestible format both for rapid processing and dissemination. The same is true for abstracts of the scientific literature which the United Nations assessment bodies will need to keep abreast of. Any global venture, such as the proposed monitoring and assessment systems, always runs the risk of a proliferation of useless information and data. We propose that the United States call for the Stockholm Conference to initiate negotiations on such standards.

The need for industrial data may not be as obvious, but is certainly equally essential. When assessing how much of a hazard to man a particular pollutant presents, it is important not only to know the sources, pathways, and toxicity, but also the industrial production and distribution of the pollutant.

Furthermore, industrial data on production and distribution is essential for an adequate review of standards and the results of control procedures. In determining whether a standard, and control measures taken as a result of such standards have been effective, it is necessary to know how much of the pollutant industry has produced since the inauguration of control measures.

Our predictive capabilities are also dependent on industrial data. Screening both existing and new chemical compounds will rely heavily on evaluating data on production, toxicity, and persistence. A promising predictive technique that could prove essential to the environmental impact statement process, as discussed elsewhere in this report, is input-output simulation models that predict emissions as a function of technological processes, production levels and alternative abatement control policies. Such modelling would be severely handicapped without accurate industrial data.

Although we are familiar with the problems of obtaining data from reluctant nations and industries, we feel, as with satellites, the international community's need for this information overrides all such ob-

jections. Therefore, we urge the United States to set an example by ensuring that its industrial data inputs meet agreed upon requirements.

G. Clearing house for computer programs

Computer modelling promises to greatly improve man's predictive capabilities in the environmental field, but the software (programs) required by this modelling is extremely expensive and requires highly trained personnel. A clearinghouse for these programs should be established, so any nation or international organization, prior to expending the effort to establish its own software, could check with the clearinghouse to see if something suitable were available. The United Nations should also establish a pool of trained personnel that could assist nations in their modelling efforts. Particularly, in the developing nations, we can expect continued reliance on major development projects to foster rapid economic growth. The value of such modelling in avoiding environmental pitfalls could be substantial.

H. Establish a standard-setting capability in the U.N. Intergovernmental Body for the Environment

We feel that one of the strongest features of the U.N. document is its awareness of the need for international governmental bodies to assess the data acquired from research and monitoring effects and to set standards which can be adopted by national and regional authorities.

It should be stressed that such standards currently exist (radiation, and drinking water); others are being negotiated (tolerances of pesticide residues in food); and that plans are in embryonic form for an international effort to establish water quality standards. Furthermore, there is a recognition of the need for standards for the highly toxic and persistent organochlorine and heavy metal compounds.

While the Committee strongly endorses these efforts, we feel that these standard setting activities, which to date have been dispersed among the specialized agencies, could beneficially be given the same focal point—the U.N. environmental office—as the scattered monitoring activities. Even more, where necessary, this office could set standards of its own.

The Executive should conceive of this standard setting capability not only as a control function, but as an opportunity to distill the best available scientific information into advice to governments for incorporation into environmentally related decisions. This advice, which may take a variety of forms, could, among other things, alert nations to hazards associated with particular levels of pollutants, or through such devices as water quality criteria assist nations in achieving desired uses of their waters—from industrial to recreation uses.

2. The Institutionalization of Interdisciplinary Scientific Advice

One reason for our Committee's optimism regarding the monitoring proposals, lies in the widespread participation of the international scientific community, both inside and outside government, in their formulation. The widespread and vigorous dialogue in the scientific community that has preceded the Stockholm Conference has served to identify key pollutants (the heavy metals, and the organochlorine compounds—DDT, PCB), list those problems that are the proper subjects of global concern (long-range climatic change, marine pollution, and the impact of pollutants on terrestrial ecosystems and human health), and recommend measures to attack these problems (gathering and assessing baseline data as a basis for control measures).

To date, these efforts have been the result of ad hoc committees and informal workshops. In the long run, we will need the advice and assistance of scientists on a more systematic basis. A permanent advisory body is an idea of great merit and should be endorsed by the United States at Stockholm.

3. Periodic Reporting

Having placed the United Nations executive at the controls of these elaborate monitoring and information systems, it seems only logical to ask that it report periodically to the world community. Such a report on the State of the world environment could list trends in key environmental indices (such indices are currently very crude), identify gaps in our knowledge, and propose new research and monitoring programs. Critiques of the efficiency of existing national and regional control measures could also be included.

We would also like to see the advisory institution perform a critical function by periodically assessing the global monitoring network and providing a critique of governmental activities.

In evaluating the monitoring network, points of consideration should be; parameters, state of the art, standardization, quality of data, gaps, and scope of the research, monitoring, and information programs. Particular attention should be paid to the information systems. It is at this point of the process that the diversity of data sources must be overcome so that the user of the information system is able to gain easy access to any desired piece of information. Data from air, water, soils, and organisms gathered by a host of physicists, chemists, and biologists within seemingly innumerable organizational units must achieve the required synthesis at the information systems level so that science may not only trace pollutants from "source to sink," but also begin to fathom the holistic relationships of the global environment. In evaluating this system, the users evaluation provided by the advisory body could be invaluable.

We would also like to have the advisory board present a critique of governmental activities. The assumption here is that the United Nations executive will probably be reporting on its own activities. Unfortunately, government reports have a tendency to be self-serving and uninformative. Even in our nation, it is exceedingly difficult for the public to pry desired information out of governmental bodies. The rationale for having the advisory board periodically assess governmental activities is the hope that it will be able to pierce the technical smoke-screen that attends many environmental discussions, along with a prayer that their commitment to scientific methodology and objective truth will result in a more candid assessment of the global environment's condition.

4. Freedom to Conduct Ocean Research

The freedom to do oceanic research is absolutely essential. Unwarranted restrictions on oceanic expeditions have been increasing. Nations, fearing foreign exploitation, have demanded increased advance notice, generated added red tape, and then have continued to withdraw authorization for expeditions that have managed to survive the bureaucratic mill. Once again, we feel that the international community has a greater interest in the results of such research than in the narrow suspicions that restrict it. Here, assurances that research results will be open to all may be of some value. Reliance on international expeditions may also be an alternative. Certainly the United States should broach the topic at the Stockholm Conference, and urge the start of negotiations.

5. Ocean Dumping

We believe that the United States delegation to Stockholm should give low priority to the proposed Convention on Ocean Dumping. The Convention would oblige nations signing it to regulate by permit the deliberate disposal at sea of all substances by vessels under their jurisdiction. Ocean dumping seems to be a very minor aspect of ocean pollution, most of which is from altogether different sources such as the atmosphere, land-based municipal and industrial sources, and oil from ships. It is safe to say that if ocean dumping were eliminated altogether the effect on the general level of ocean pollution would be extremely slight.

It is unlikely, however, that the permit system set forth in the proposed convention would have much effect on even this minor problem. Although the convention states that nations will not issue permits for dumping which would "unreasonably degrade or endanger human health, welfare or amenities," the interpretation of this vague state-

ment—that is, the setting of standards by which permits would be granted or denied—is left entirely to the nations individually. Nations could live up to their convention obligations by establishing a permit system even if they placed no restrictions whatever on ocean dumping itself. This seems to us an unpromising approach: we cannot see why any nation which has not already seen fit to restrict dumping would find it worthwhile to begin restrictions simply by the fact of signing this document.

It should also be asked whether a convention such as this, which requires the agreement of as many nations around the globe as possible, is the most productive of the many possible approaches to controlling ocean pollution. The weakness of this convention, after the United States has invested so much skill and effort in it, may be seen not as a sign of the indifference and shortsightedness of other nations but simply as a reflection of the practical facts of the ocean pollution problem. Ocean pollution seems to be in great measure a regional rather than global matter. The nature of the problem varies greatly around the globe, so it seems logical that while world-wide agreements must be vague and hortative, regional ones might be highly specific—individual nations have a larger interest in negotiating with their immediate neighbors to remedy the particular problems which affect them directly. This seems to be the case in the Mediterranean and the North Sea, where nations are negotiating agreements, in preparation for the Stockholm Conference which are far more extensive than the ocean dumping convention could ever be. Further examples of the utility of the regional approach are the work of NATO's Committee on the Challenges of Modern Society and the agreements being reached between the United States and Canada regarding the Great Lakes.⁵

Other aspects of ocean pollution require different approaches. Some of the most dangerous pollutants such as DDT are truly global, reaching the oceans through the atmosphere, or surface water runoff, and demand direct limitations on the use of the substances themselves. But other pollution problems affect primarily the nations that caused them; most ocean dumping, which takes place a few miles off shore, seems to fit this category. Where this is so, national programs, will be entirely adequate if seriously enforced. Actions such as these seem to hold far greater potential for reducing ocean pollution than the proposed ocean dumping convention.

⁵ See Chapter II, Advisory Committee Recommendation 7.

RESPONSE TO U.N. RECOMMENDATIONS

Responses of the Advisory Committee to the Recommendations of the Report by the Secretary-General of the U.N. Conference on the Human Environment on the "Identification and Control of Pollutants of Broad International Significance" (A/CONF 48/6, 7 January 1972).

A. Pollutants of International Significance

(i) General Recommendations

218. *It is recommended that* Governments be especially mindful of activities in which there is an appreciable risk of effect on climate, and,

— carefully evaluate the likelihood and magnitude of climatic effects and disseminate their findings before embarking on such activities;

— consult fully other interested States when activities carrying a risk of such effects are being contemplated or implemented.

Response: 218. The Advisory Committee concurs, see discussion in the Introduction.

219. *It is recommended that* Governments use the best practicable means available to minimize the release to the environment of persistent and toxic substances, particularly heavy metals and organochlorine compounds, until it has been demonstrated that their release will not cause adverse effects or unless their use is essential to human health or food production, in which case appropriate control measures should be applied.

Response: 219. The Advisory Committee concurs. See discussion in the Introduction.

220. *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 organization in planning and carrying out control programmes for pollutants distributed beyond the national jurisdiction from which they are released.

Response: 220. The Advisory Committee concurs. We feel there is a need for an immediate assessment by international bodies on the heavy metals and the organochlorine compounds.

221. *It is recommended that* Governments avoid creating barriers to international trade to off-set the costs of pollution control and that they consult with other concerned governments, even though there may be no legal obligation to do so, with a view to avoiding the creation of non-tariff barriers due to variations in national standards for goods or for the transport or use of goods.¹

Response: 221. The avoidance of barriers to international trade is a matter of political will. The long-run solution lies in some form of international standards. Here, the participation of the third world is essential.

(ii) Acquisition of Knowledge

¹ This recommendation should be read in conjunction with recommendations concerning international trade relations in subject area V on development and environment.

222. *It is recommended that* Governments actively support and contribute to international programmes 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.

Response: 222. The Advisory Committee concurs.

223. *It is recommended that* the Secretary-General, drawing on the resources of the entire UN system, and with the active support of Governments and appropriate scientific and other international bodies;

increase the capability of the UN system to provide awareness and advance warning of deleterious effects to human health and well-being from man-made pollutants;

provide this information in a form which is useful to policy makers at the national level;

develop means to assist those Governments which desire to incorporate these and other environmental factors into national planning processes.

Response: 223. The Advisory Committee concurs.

Towards these ends, with regard to:

DIRECT EFFECTS ON MAN

Health

224. *It is recommended that* a major effort be undertaken to develop monitoring and research programmes providing data for early warning of the deleterious effects of the various environmental agents to which man is increasingly exposed, and for the quantitative assessment of their potential risks to human health. Such programmes should be guided and co-ordinated by WHO.

Response: 224. The Advisory Committee concurs.

Air and Water

225. *It is recommended that* WHO, in collaboration with the relevant agencies, assist Governments, particularly those of developing countries, in undertaking biological and chemical monitoring of water and in establishing air monitoring stations in urban areas.

Response: 225. The Advisory Committee concurs.

Food

226. *It is recommended that* internationally co-ordinated programmes of research and monitoring of food contamination by chemical and biological agents be established and developed jointly by FAO and WHO and that the results of monitoring be expeditiously assembled, evaluated and made available so as to provide early warning of rises in contamination.

Response: 226. The Advisory Committee concurs.

INDIRECT EFFECTS

Climate

227. *It is recommended that:*

approximately ten baseline stations be set up in areas remote from all sources of pollution, to monitor long-term global trends in atmospheric constituents and properties, which may cause changes in climate;

a much larger network of not less than one hundred stations be set up for monitoring air quality on a regional basis and especially changes in the distribution and concentration of contaminants;

these programmes be guided and co-ordinated by the WMO;

and, in addition, WMO, in co-operation with ICSU, continue to carry out the Global Atmospheric Research Programme (GARP), and if necessary establish new programmes, to understand better the general circulation of the atmosphere and the causes of climatic changes.

Response: 227. The Advisory Committee concurs.

Terrestrial ecosystems

228. *It is recommended that the Secretary-General ensure that:*

research activities in terrestrial ecology be encouraged, supported and co-ordinated through the appropriate agencies, so as to gain adequate knowledge of the inputs, movements, residence times and ecological effects of pollutants identified as critical;

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 MAB programme in all major ecological regions, to facilitate intensive analysis of the structure and functioning of ecosystems under natural or managed conditions;

the feasibility of using stations participating in this programme for surveillance of the effects of pollutants on ecosystems be investigated;

programmes such as MAB be used to the extent possible to monitor

- accumulation of hazardous compounds in biological and abiotic material at representative sites.
- the effect of such accumulation on reproductive success and population size of selected species.

Response: 228. The need is for baseline stations. See recommendation

1(a).

(iii) *Control*

Food

229. *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.

Response: 229. The Advisory Committee concurs.

Air and Water

230. *It is recommended that* the WHO, in conjunction with the appropriate UN agencies, develop derived working limits for common air and water contaminants.

Response: 230. The Advisory Committee concurs.

(iv) Support

231. *It is recommended that Governments provide information to the Secretary-General concerning their experiences with pollution control activities, including legislative and administrative arrangements, technology, cost-benefit methodology, and that the Secretary-General make this information available to those who desire to benefit from the experience of others.*

Response: 231. On the international level, this presents one of the best hopes for control for the immediate future. The United Nations has placed most of the burden for the present, and rightly so, at the national and regional level. The transfer of technology and control strategies represents a non-compulsory alternative that will hopefully allow developing nations to avoid some of the undesirable externalities that have beset both industry and society in the developed world. The Committee does feel that where an alternate pollution control activity is substituted that poses some greater short-term risk, like more lethal non-persistent pesticides, either the exporting nation, or an international agency should provide a broad education program to accompany the alternative. Cases such as the death of dock workers in Algeria from scooping lethal compounds from larger to smaller containers by hand, are matters of great concern.

The transfer of pollution technology is more than an idle hope. The universality of production technology ensures the transferability of abatement technology. The Environmental Protection Agency in the United States has spent the past year in preparing its permit program. They currently have information on sampling, monitoring, and analytic techniques along with pollution abatement technology capable of providing the equivalency of secondary treatment of effluents on an industry-by-industry basis. The licensing of such technology by American industry holds forth the possibility of American industry becoming proselytizers of environmental concern.

(v) Machinery

232. *It is recommended that any intergovernmental mechanism which may be established within the United Nations in connection with environmental problems should include among its functions:*

determination of which pollution problems are of international significance
consideration of the appointment of appropriate intergovernmental, expert bodies to assess quantitatively the exposures, risks, pathways and sources of pollutants of international significance;

review and co-ordination of international co-operation for pollution control ensuring in particular that needed measures are taken and that measures taken in regard to various media and sources are consistent with each other

examination of the needs for technical assistance to Governments in the study of pollution problems, in particular those involving international distribution of pollutants.

Response: 232. The Advisory Committee concurs.

B. Marine Pollution*(i) General Recommendations*

233. *It is recommended that Governments:*

accept and implement existing instruments on the control of the maritime sources of marine pollution;

ensure that the provisions of existing instruments are complied with by ships flying their flags and that adequate provisions are made for reviewing the effectiveness of, and revising, existing and proposed international measures for control of marine pollution;

ensure that ocean dumping by their nationals is controlled and complete and bring into force as soon as possible an overall instrument for the control of ocean dumping, as well as needed regional agreements within the framework of this instrument;

participate fully in the 1973 IMCO Conference on Marine Pollution and the Law of the Sea Conference 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 under appropriate controls;

strengthen national controls over land-based sources of marine pollution.

Response: 233. The Advisory Committee concurs with all of this recommendation except the ocean dumping section. See Advisory Committee Recommendation III-5.

(ii) Acquisition of Knowledge

234. *It is recommended that Governments:*

support national research and monitoring efforts that contribute to agreed international programmes for research and monitoring in the marine environment, in particular GIPME and IGOSS;

register the discharge of significant quantities of radioactive materials to the oceans with the IAEA, as well as co-operate with IAEA in the expansion of this registry to include all discharge of significant quantities of radioactive materials into the biosphere;

provide to the UN, FAO and UNCTAD, as appropriate to the data-gathering activities of each, statistics on the production and use of toxic and persistent materials;

expand their support to components of the United Nations system concerned with research and monitoring in the marine environment, especially the IOC in order that it can take on additional responsibilities for promotion and co-ordination of scientific services.

Response: 234. The Advisory Committee concurs.

235. *Assessment—It is recommended that the Secretary-General, together with the sponsoring agencies, make it possible for GESAMP to:*

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

assemble scientific data and develop a set of scientific considerations to be taken into account in the regulation of ocean dumping and continue its comparison of national marine water quality standards.

Response: 235. Consideration should be given to expanding the Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) and giving it permanence.

236. *Research—It is recommended that the Secretary-General ensure that:*

mechanisms for combining world statistics on mining, production, processing, transport and use of potential marine pollutants are developed along with

methods for identifying high priority marine pollutants based in part on such data;

GESAMP, in consultation with other expert groups, proposed guidelines for test programmes to evaluate toxicity of potential marine pollutants;

FAO, WHO, IOC and IAEA encourage studies of the effects of high priority marine pollutants on man and other organisms, with appropriate emphasis on chronic, low-level exposures;

IOC, with FAO and WHO, explore the possibility of establishing an international institute for tropical marine studies, which would undertake training as well as research.

Response: 236. The Advisory Committee concurs.

237. *Monitoring—It is recommended that* IOC, in co-operation with other interested UN bodies, promote the monitoring of marine pollution, preferably within the framework of IGOSS and develop methods for monitoring high priority marine pollutants in water, sediments and organisms, with advice from GESAMP on intercomparability of methodologies.

Response: 237. The Advisory Committee concurs. Baseline stations are also needed (see Advisory Committee Recommendation 1(b)).

238. *Information Exchange—It is recommended that* IOC ensure that provisions are made in international marine research and monitoring activities for dissemination of information in a form usable by Governments, with attention paid to the special needs of developing countries, and consider, with FAO, the need for expansion of existing data centres to fulfill anticipated needs, with emphasis on referral systems.

Response: 238. The Advisory Committee concurs. Ensuring the full participation of developing countries is especially important.

(iii) Control

239. *It is recommended that:*

governments collectively endorse the principles set forth in paragraph 197 as guiding concepts representing a basis for general agreement, in particular at the 1973 IMCO Conference on Marine Pollution and at the Law of the Sea Conference scheduled to begin in 1973;

the Secretary-General, with the support of FAO, IAEA and UNIDO, consider providing guidelines to Governments for the control of all significant sources of marine pollution, including especially land-based sources, including recommendations as to the best practicable means.

Response: 239. The Advisory Committee concurs. But, ocean research (Advisory Committee Recommendation 4) should be broached at Stockholm and not deferred to the Law of the Sea Conference.

(iv) Support

240. *It is recommended that:*

any intergovernmental mechanism which may be established within the United Nations in connection with environmental problems should include among its functions overall responsibility for assuring that needed guidelines of this type are provided to Governments;

the Secretary-General take steps to secure additional financial support to those training and other programmes of assistance that contribute to increasing the capacity of developing countries to participate in international research and monitoring programmes.

Response: 240. The Advisory Committee concurs.

Subcommittee 3

The Control of Pollutants and Nuisances of Broad International Significance

Christopher DeMuth, *Chairman*
Former White House Staff Member

Mr. Robert Anderson
Chairman of the Board
Atlantic Richfield Corp.

Mr. Edward Cole, President
General Motors Corp.

Mr. Charles Luce
Chairman of the Board
Consolidated Edison Co.

Mr. Thomas Malone
Chairman, Committee on International Environmental Problems

National Academy of Science

National Academy of Engineering
(University of Conn. Graduate School)

Subcommittee Director
W. Lee Rawls

4. Education

Educational, Informational, Social, and Cultural Aspects of Environmental Problems

INTRODUCTION

The educational, informational, social, and cultural aspects of environmental problems are among the most crucial matters scheduled for the Conference. It has been suggested that present science and technology can solve most environmental problems and, that for many others, solutions are available through the modification of certain human activities. A resolution of national and international environmental problems will require an understanding and modification of the social, psychological, economic, political, moral, and religious assumptions and practices that have influenced human activities leading to the crisis of the environment.

While the mobilization of relevant political forces to achieve international governmental action is necessary to terminate the current conscious and unconscious policies of wasting natural and human resources, the ultimate survival of man depends on the adoption by mankind of a global environmental ethic.

In order to manage his ambitions and growth in a manner compatible with a finite global life support system and in an atmosphere conducive to his greatest happiness and development, man must be aware of and responsible for the consequences of his activities.

In the developed nations, governments must support legislation to prevent national and international pollution, the unwise depletion of nonrenewable natural resources, and to encourage the recycling and reuse of materials. Still more valuable are imaginative educational programs to revitalize the participation in problem-solving and decisionmaking by the majority of citizens in their own societal growth.

Assistance must be provided to policymakers and planners of developing nations, through educational programs, to encourage the most effective short and long term use of human and natural resources with emphasis on managed, responsible societal growth at each stage of development.

Emphasis should be placed on assisting the design of educational programs that not only answer vocational demands but prepare persons to join in the decisionmaking processes of their society. Man's unique problem-solving ability must be encouraged if he is to remain involved in his own destiny, that of his fellow man, and of his progeny, and if he is to realize the fullest expression of his human nature.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE

1. There should be established a U.N. environmental information exchange.

2. To coordinate the United States programs implicit in our responses to the Secretariat recommendations at the end of this chapter, a high-level Executive Office administrative mechanism should be established to:

A. Develop and coordinate distribution of international environmental programs.

B. Quantify and qualify environmental information for submission.

C. Develop a U.S. environmental program and personnel referral system.

3. We recommend that a citizens advisory committee be set up to help develop international environmental training programs.

4. We support the establishment of a U.S. Center for International Environmental Studies, to investigate the reactions of the natural environment to the products of industrial, urban, and societal growth. Such a Center should work in cooperation with other centers of environmental study.

5. We commend the initial investigations into technology assessment and urge that further related studies receive government support. We also recommend that a high priority be given to investigations of technology assessment in the new international scientific institution recommended in the section on institutional arrangements.¹

6. The Committee suggests that the U.N. sponsor research into the optimal human environment considering the integral relationship of all environmental elements and their abilities to remain viable through tolerance, adaptation, assimilation, and other processes.

¹ See ch. V, Advisory Committee Recommendation 5.

DISCUSSION OF THE RECOMMENDATIONS

Background—A Social-Cultural Analysis of the Crisis of the Environment

A profound and disturbing aspect of recent history has been the world-wide recognition that industrialization and the consumption of its products, pursued for several centuries with some of the highest human motivations, raised the possibility of the extinction of mankind, or at least of a lessened—not heightened—quality of human life. This recognition of the threat to man's existence and well-being has evoked a response from Americans like the response to such fundamental threats as an attack on their country. It has collapsed many of the divisions that ordinarily separate man from man and group from group. Not as immediate as the threat of attack, the threat to the living matrix of our environment has united large numbers of thoughtful persons in that they will not sacrifice their existence to the heedless production and consumption of goods and services. Many have realized that the only worthy justification for our industrial development was to improve the human life-experience and that, if industrialization was failing this achievement, then appropriate changes in our modes of production, consumption, and distribution were required.

We have united in responding to the environmental threat with numerous and diverse responses: theologians develop a new theology of nature; scientists engage in intensified basic research; corporations devise new nonpolluting technology; lawyers seek to derive new environmental rights; educators integrate environmental knowledge and perspectives into curricula; communities establish recycling centers; political action groups demand legislation limiting pollution; ecological activities stage dramatic demonstrations to expose polluters. Concern for the environment has indeed become a pervasive factor in our perception of the world.

The recognition of the threat to the human environment and the *demands* for action to reduce it are among the most hopeful signs in the world today. But these are yet only relatively small seedlings if we consider the full dimensions of the problem. They are seedlings of concern for man and for life in general that must be nurtured by every impulse for the good that we find within us, individually and as a society. The initial steps have been taken; much remains yet to be done.

The view we take, both as history and as judgment, of our own industrial development will profoundly influence our notion of what must be done and our motivation to carry it through. This is not the place to review the efforts that have already been made to understand

what happened in the industrial development of the West, what its causes and consequences were, and to evaluate its contribution to human weal or woe.

It is sufficient to suggest that we view the industrial era, and especially the past 25 years, as a vast half-conscious social experiment which is now revealing the limits of man's mastery of nature and testing what the products of industrialization can do to improve the quality of man's experience of life. It is even now a continuing experiment, and all of the results are by no means available. On the one hand, we do not yet know the full dimensions of the harm that has and can be done to man and the environment; on the other hand, some new scientific discovery may tomorrow spawn a technology that will cause a complete reevaluation of the seriousness of the environmental crisis. But, granting the possibility that new technology, new processes, and new materials may avoid environmental degradation, we must nonetheless deal with the crisis of the environment as it is now—and likely will remain for some time. The saving technology may not come for a hundred years; we cannot risk the demise of humanity—indeed, of life itself—upon the unpredictable results of scientific research.

As we pursue our social experiment—an experiment whose materials and goals constantly change—we need more than simply technology research. There is a wide variety of environmental concern and action today; but because it proceeds in so many directions and from many springs of action, there is a danger that it may not successfully accomplish what needs so desperately to be done, that the concern for life may discharge itself in unfocused activity. Some sort of unified vision of the environment and rationale for the actions to protect and enhance are necessary. We can not provide such a rationale here; we can only suggest some possible aspects of such a rationale.

One general principle emphasizes the importance of avoiding partial thinking. The environment is the arena for the interplay of a wide multiplicity of forces of varying degrees of strength and breadth of influence. Universal forces are modified by local forces, and vice versa. We cannot thoroughly understand the role of any part or aspect of nature without understanding how it is related to other parts or aspects. Thus, when we narrowly see the large numbers of a certain species of fish in an area, without noticing its role in the ecological balance, man seeking an immediate food supply may overfish that species of fish. The current interest in systems analysis would seem to indicate a reviving interest in a more unified view of the world. Surely such an approach is required in every environmental matter.

We must consider and weigh every aspect of the production of that particular thing: not only its extraction, production, and sale; but also the energy requirements, the degradation of the mining area, the disposal of the waste products, and the avoidance of pollution during the life-time of the product.

We also must look at the human and social consequences of introducing new products. Previously, we have tended to emphasize the anticipated good—some expected increase in the level of human living, some lengthening of life, some pleasure for our amusement. But the upheavals of established social institutions that industrialization has caused convinces us that we must call a halt to the thoughtless and uncontrolled proliferation of ever-new technological products. Even current technology must be reviewed in order to restore and maintain a psychologically meaningful and morally fulfilling life-experience for man.

Particular attention should be devoted to the impact of population and its distribution on available resources, as food, clothing, housing, health services, and education. The impact of population as a major factor in environmental pollution is an unresolved problem which requires continuing study.

It is clear that modern science, technology, industrialization, and the crisis of the environment have not happened accidentally. Whitehead argued that the rise of modern science owed much to the Christian faith in the dependability of God. (Daniel D. Williams, *Earth Might be Fair*, p. 51.) This and Lynn White's view that Western Christian man has seen himself as having received the earth from God to master and exploit are two of the most perceptive insights into the origins of the environmental crisis. But this analysis has not proceeded very far or very long. If we are ultimately to make a difference in the way in which men view their world, much more thought must be given to an understanding of the beliefs, attitudes, and systems of thought that have led to the present situation. It is not adequate to say that pollution comes from that factory, or industry, or technology, or even science, but rather we must come to understand why society has used each of these in a manner which has degraded the earth and perhaps threatened our own survival. One of the most important developments that might come out of Stockholm would be coordinated efforts throughout the world to investigate, in the light of modern scientific knowledge of the physical and biological world, the manner in which differing cultures have viewed nature, as well as coordinated efforts to understand how man must now live with respect to the environment, particularly in view of recent studies (*The Limits of Growth*, Meadows) which anticipate early exhaustion of major world resources.

More generally, it can be argued that regardless of what actions are currently imperative in the environment, we will be better advised in future actions, if much more basic research is carried out in the biological, physical, and chemical aspects, as well as in the uniquely human aspects, of the total environment. The Conference on the Human Environment at Stockholm should give every encouragement to national governments, UNESCO, foundations, universities, and individuals to widely pursue wide-ranging and deep investigations into the nature of the environment and its multiplex constituents (including man) in their complex interrelatedness.

Then, as this research is performed, it must be organized into the total body of human knowledge, translated into many languages, and made available to students in all levels of instruction: to those who are being trained as specialists for the environmental field; and to the public in general.

Finally, philosophers and theologians must be encouraged to look afresh at the world that surrounds them remembering the recently identified environmental problems which include population density and distribution. For theologians, there are new problems of the relation between God, man, and nature; for the moral philosopher, new problems of values and rights for nonhuman things; and for the metaphysician and philosopher of nature, new problems of interpreting the significance of the multiple interactions empirical science is showing us in the world that surrounds us.

United States Participation in International Programs on the Human Environment

Recent evidence suggests that programs of international development are not given a high priority by the average American citizen. Thus, without a considerable educational effort, any new efforts in international environmental programing may have even less credibility.

The concern for environmental quality in the United States did not emanate from those who have been primarily concerned with economic development. Rather, it has resulted from a shift of priorities and participation by individuals and groups in both the public and the private sector. If, indeed, the participation and expertise of each segment of our society is necessary for achieving responsible national growth, participation in international programs on the human environment should demand societal rather than just a policy commitment.

Since the environmental problems—starvation, poor health, inadequate housing, lack of education—of the developing nations are closely associated with the lack of economic development, exportation of environmental programs from the developed nations should not be at

the expense of the very limited monies available to the developing nations for economic development.² This suggests that not only must the talents of our society be available for participation in international environmental programs, but that a portion of the costs of new education and training programs offered to other nations also must be assumed. If this new participation requires financial and personnel commitments, it should be identified and secured. Since additional demands upon finances and resources must compete with other individual and national priorities, public education programs must emphasize that participation in international programs on the human environment will benefit all.

Regardless of what international agreements or treaties result from the Stockholm Conference, successful completion will depend on the participation of many countries. Although the developed countries possess the resources necessary to establish their own information exchange programs and educational, research, and training programs, the developing nations will continue to look toward the more advanced nations, and particularly the United States, for expertise for their policymakers and planners, educators and researchers, managers and technical specialists, to incorporate environmental programming as an integral part of their development.

The demands for assistance will require the identification of those who can most effectively meet the demands, e.g., inhouse or Federal laboratory programs, industry, municipal, State or Federal programs, youth and citizens' action groups, or the Nation's universities, and at a level of sophistication compatible with the developmental stages and culture of the recipient country. The personnel and facilities capable of answering the demands for assistance in the educational, technical, research, and training areas reside both within the United States and in the existing programs being conducted internationally by public and private groups.

1. International Environmental Information Exchange

The establishment of an United Nations Environmental Information Exchange should involve, among other things, the identification and computerization of diverse environmental model programs, rosters of available environmental personnel, and a classification of development technologies along with appropriate technological assessment. This United Nations data bank will only be as useful as the quality of the information submitted by member countries. National mechanisms do not exist within the United States for quantifying and qualifying the massive amount of environmental material available, neither with

² See ch. V, Advisory Committee Recommendation 2D.

respect to subject matter to the levels of sophistication and applicability to various stages of development and cultural background. The United States could greatly assist other nations by defining criteria for qualifying and quantifying of environmental information to be submitted to such an Exchange.

2. Executive Office Administrative Mechanism

This mechanism, in which the State Department and other major Federal environmental agencies as the Council on Environmental Quality and Environmental Protection Agency will participate, should:

A. Develop and coordinate the distribution of educational materials demonstrating the value to each segment of our society of United States participation in international environmental programs. This office should coordinate the allocation of Federal expenditures to develop such educational materials to be utilized in precollege, college, and continuing educational curricula.

B. Quantify and qualify environmental information to be submitted by the United States for inclusion in its Environmental Information Exchange. These materials—qualified with respect to subject, level of sophistication, and applicability to various cultures and stages of economic development—should be made freely available nationally and internationally.

C. Develop a U.S. Environmental Program and Personnel Referral System, to identify individuals and programs throughout society who can participate in training of other nationals here and abroad. The Environmental Program and Personnel Referral System should include individuals and programs within Federal organizations, environmental groups, industry, universities, citizens' action groups, and municipal and State programs. The System should assist other nations in cultural, educational, research, and technical training programs that were identified in the National Environmental Reports submitted to the Secretary-General of the Stockholm Conference last year. The System should be set up at a location convenient for use by the State Department and all public and private organizations involved in international environmental efforts.

3. Citizens' Advisory Committee

A citizens' advisory committee of persons from environmental groups, industry and labor, State and local governments, educational and research institutions, citizen and youth action groups which are interested and experienced in domestic and international environmental programs should be established to help develop environmental training programs for nationals of other countries. With the aid of the

Referral System, the Committee also could identify resources needed for regional and international cooperative environmental programs, appropriate to the level of development and culture of the recipient country, and advise on whether particular training programs might better be carried out within the United States or in the recipient country, and whether under governmental or private auspices.

4. The Need for a U.S. Center for International Environmental Studies

Although the preparatory Secretariat Papers include many references to the need for a truly interdisciplinary approach to environmental matters, these suggestions assume that responsible planning and development can be achieved merely through an undefined association between biological and physical scientists, economists, social and political scientists, and managerial contributors. There has been little or no effort to discover how these different approaches might be integrated and coordinated to avoid the undesirable impacts that advanced technologies have on the social and cultural fabric of a people and on the natural environment.

It is now clear that the externalities of modern material processing and agricultural production, in combination with the wastes of a dominating human population, are becoming significant in comparison to the integrating effects of all other biological organisms. Local waste concentration levels in the atmosphere and hydrosphere already exist that not only seriously imperil the cultural and recreational rewards of modern life, but are potentially destructive to components of the natural environment that are essential to support the basic metabolic functions of human life.

Until this point in history, industrialization has taken place without parallel development in the management of industrial and technological progress. A greater portion of the land masses of the world and, indeed, the majority of mankind in the developing nations, are now in a unique position to assume an important new role in societal development. They have at their disposal an impressive shopping list of developed and proven technologies and processes from which to choose, and they can implement them at a variety of levels. They can perform the next major step of human endeavor by showing how selected agricultural and physical production technologies can be rationally coordinated, integrated and geographically distributed to form an industrialized life support system that is technically compatible with the environment and is based on the life-style and cultural values of their people. The pursuit of such goals demands that the United Nations assume an important role of leadership in peaceful cooperation

between nations, dedicated to planned international industrial development and trade policies based on maximizing the total productivity of the world (as measured in human values) within the regionally specific limitations of the environment and the social and cultural values of the cooperating nations. To accomplish these objectives, the development of an environmental management science is therefore urgent and critical as a corrective measure and as a base for future developments.

The United States has developed the scientific and technological base for modern agricultural and industrial practices, and has the expertise and resources to contribute to this area of environmental education and research, where factual data is alarmingly lacking and is indispensable for purposeful planning of a viable global ecosystem. Pollution, which in many instances represents an accumulation of valuable energy forms, exists only when the assimilating abilities (recycling or detoxifying) of a local, regional, artificial, or natural landscape is exceeded. Man himself never reaches or expresses full psychological and biological potential when he is polluted by either overt toxins of societal growth or the unnatural hazards of urban living (noise, crowding, occupation stress). While both the natural environment and man display considerable adaptability to subtle or toxic insults, a fine line exists between the apparent stability of adaptive processes and final exhaustion of adaptive potential. It is imperative that factual information on the natural environment be developed, to replace theory and guessing with logic and reason on our planet's future.

The United States should establish an International Environmental Center to recruit the talent that can understand the extremely complex interactions of scientific, technological, economic, political, sociological, forensic, and managerial components essential in the environmental design and management of artificial and natural ecosystems. One function of the International Environmental Center would be to accumulate existing knowledge and to coordinate and design research projects on the capacities of the media (air, soil, and water) to deal with existing and anticipated waste products of industrial and societal growth. For short planning horizons and low waste concentration levels, bigger and more productive industrial and agricultural machines, per se, represent a quick and low cost (as measured in human effort) way for man to improve his material standard of living. It is acceptable and perhaps the appropriate first step toward industrialization. But as regional densities of industry and human populations increase, a point is ultimately reached, as is now the case, where the flow rates of wastes exceed the capacities of the natural and

national environment to dilute and assimilate them. This limit represents the start of ecological breakdown beyond which the natural environment ceases to function and provide the required process functions essential to human life. Responsible planning for land use and community design, the distribution of industry, efficient energy utilization, and the planning of living communities can only be meaningful when the assimilating capacity of the specific environment under consideration has been estimated.

A second major objective of a U.S. International Environmental Center would be to accumulate existing knowledge and sponsor research and educational programs to determine an attainable environment for man during work and leisure most conducive to his cultural and social benefit. Multidisciplinary research, for national and international use, on the broadly social, cultural, and economic aspects of environmental issues, coupled with new knowledge on national and international media would provide information that is not yet available.

5. Technology Assessment

The heedless view of the past was perhaps natural and understandable enough to a people fascinated by the first fruits of advanced technology—but it will no longer suffice. We must consider *all* of the human and social consequences that flow from current production and that can be expected to flow from new products. It is not enough to search for new filters or new processes of recycling. We must ask in detail what the consequences for man will be. We need "technology assessment," we need to develop fully a science for evaluating the total physical and social consequences of any product or process.

Technology assessment is especially needed in the underdeveloped countries. The rate of the introduction of technology in the West was relatively low in the early stages (allowing some time for social adjustment—which was violent enough—to occur). Early technology was relatively unsophisticated and involved materials that remained relatively close to their natural origins (there was no plastics industry 200 years ago) which tended to limit serious pollution. However, the underdeveloped countries today are driven by extreme political pressures to achieve immediate results by the introduction at a high level of technology. Thus, DDT, in one way and inexpensive transistor radios in another way have cascaded upon underdeveloped countries' population increases, exhausting new economic growth and setting up demands for material goods that cannot be met. The experience of the last 25 years has made it clear that high technology, should be introduced carefully in underdeveloped countries with full planning,

according to a time table and on a wide enough spectrum, so that an increase in population does not overwhelm food supplies, educational and health services, housing, or transportation. Such planning must also take into account the particular people involved; some underdeveloped countries can profit from adopting modern views of planning and saving, others are by no means sympathetic to such attitudes.

"Technology assessment" (which estimates all relevant human and social consequences) leads to and requires "technology control." Ultimately, the use of resources, particularly of energy, and the introduction of new products and processes must be under the control of those responsible for the survival of mankind. The question of the political structure, while extremely important, is not as important as that of political will. The pollution of Lake Erie and Lake Baikal illustrate that, without the political will to act, questions of governmental structure are irrelevant. However, environmental questions may become so serious in some countries that demands will arise for "environmental dictators" to save man from annihilation. All pray that it will not come to this—indeed, the threat of it may stimulate the political will to act on environmental threats throughout the world.

6. Research Into Optimal Living Environment

It has been suggested that modern man has reached the limits of his psychological and biological abilities to adapt to an industrialized or urban society, and indeed is on the brink of extinction. While not accepting this entire pessimistic view, it is reasonable that we be as concerned about man's welfare as the other creatures he is accused of exterminating.

In an urbanized world, man's housing, whether in transit at work, at home or during leisure—constitutes an environment he primarily designs. An optimal or attainable environment for his greatest development, happiness and contribution can only be achieved from the combination of colors, fabrics, textures, and noises resulting from the skillful use of artificial and natural environments. There is very little knowledge of the optimal number and type of stimuli conducive to the greatest development of a child's capabilities or an adult's performance, let alone the influence of single or multiple environmental stimuli, at various levels—noise, crowding, light, heat, etc.—on man's psychological or biological welfare. Some emphasis is placed in the preparatory papers issued by the Secretary-General on this matter and yet very little is known about the design of the immediate ambient environment for the greatest expression of man's happiness and welfare.

The Advisory Committee strongly recommends that the United Nations establish a program to determine "an optimal or attainable environment for the greatest expression of man's development and expression." This would include a critical world survey of the existing knowledge on the influence of various combinations of environmental stimuli on the psychological and biological welfare of man. There should also be established through the United Nations an International Human Environmental Laboratory where experimentation on the influence of various thresholds of environmental stimuli on man's performance and welfare can be conducted, in order that reasonable standards can be developed for future inclusion in community design, transportation, and industrial and residential housing.

RESPONSE TO U.N. RECOMMENDATIONS

Response of the Advisory Committee to the Recommendations of the Report by the Secretary-General of the U.N. Conference on the Human Environment on the "Educational, Informational, Social and Cultural Aspects of Environmental Issues" (A/CONF. 48/9, 21 December 1971).

A. Continuous Social Diagnosis

109. A large mass of data is already available in all countries on the environmental situation and its social implications, and in particular on the resources available (natural resources, housing, services, cultural heritage, etc.) and their utilization and distribution (behaviour patterns, degrees of satisfaction, etc.). Merely to collect the most useful data would be enough to allow a first assessment to be made of the situation and would provide the requisite rational grounds for the choice of policy priorities (identification of crucial needs) and for educational action (the collation and interpretation of knowledge).

(i) *Recommendations for national action*

110. *It is recommended that* the attention of Governments should be drawn to the need to adopt the following measures:

the periodic preparation of a *national report* on the state of and outlook for the environment, after careful study of the specific national needs for information on this subject and with due attention to the goals of economic planning and programming;

the strengthening and co-ordination of *action in progress* with regard to:

- the institutional organization of environmental monitoring from the social and cultural standpoint and, in particular, the establishment of social and economic programmes for monitoring the development of the situation, making use of existing institutions;

- the selection of social and cultural indicators of the environment;

- the setting of standards and criteria for the quality of life, after a forward-looking study, *inter alia* by inquiry, of the socially desirable minima for certain social, economic and cultural parameters and indicators of the environment;

- an analysis of the *conflicts* between *private* interests and the *public* interest in the use of the environment, and a study of institutions and planning methods for resolving such conflicts in the short and long term.

Response: 110. The Advisory Committee concurs with the recommendation that national governments periodically prepare reports on the state and outlook of the environment from a general social and cultural point of view, and that they support the development and identification of "social and cultural indicators" and the determination of standards for the minimum permissible "quality of life." The Committee agrees also that to the extent that such reporting is already done, it should be strengthened, and that all such reporting should be coordinated among the nations of the world.

(ii) *Recommendations for international action*

111. *It is recommended that the Secretary-General should make arrangements: for the United Nations system to provide countries on request with the necessary technical 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 and economic programmes;*

to study the desirability of a project for continuing co-operation among national social and economic programmes in an international network. The organizations of the United Nations system, including the regional economic commissions, would be called upon to participate in this activity, and so would other international governmental and non-governmental agencies;

to organize the exchange of information on experience, methods and work in progress in connexion with the continuous social diagnosis, particularly at the regional level and between regions with common problems;

to prepare, on the basis of the national reports on the state of and outlook for the environment, periodic reports on regional or sub-regional situations and on the international situation in this matter;

The activities described above could be conducted by the new bodies for environmental co-ordination.

Response: 111. The Advisory Committee further agrees that the United Nations and its agencies should work with the nations in the preparation of these national reports, and should prepare from the national reports, regional and world reports.

B. Educational Action

112. Education and training on environmental problems are vital to the long-term success of environmental policies because they are the only means of mobilizing an enlightened and responsible population and of securing the manpower needed for practical action programmes.

(i) *Recommendations for national action*

113. *It is recommended that* the attention of Governments should be drawn to the need to adopt the following measures:

at the school level, a thorough revision of curricular to adapt them to modern methods of teaching. Besides introducing new material into certain subjects more particularly concerned with the environment (natural sciences, physical and human geography), it will be necessary to encourage

an ecological approach: i.e., to forge inter-disciplinary links between the various subjects taught and, in particular, to use active and integrated methods of teaching—field excursions, open-air centres, country classes for town children, simulation of cases based on local examples, audio-visual aids, etc.—calculated to prepare the students for participation. These experiments in teaching should not neglect the pre-school level. For the training of intermediate-level technicians, training institutions will have to be established or adapted to suit the widely varying needs of different countries;

at the university level, intensification of the training of specialists in the basic disciplines

of environmental management and of administrators specializing in the management of pluridisciplinary systems, after a careful survey of requirements and possible markets for their services. The appropriate university courses should be instituted or brought up to date in order to deal with current problems. As to the administrators specializing in the management of pluridisciplinary systems, it may be thought appropriate that people already qualified in a suitable basic discipline should be professionally trained to take charge of teams for the study and management of systems of interdependent activities concerned with the environment, such as the integrated development of an urban complex, the development of a river basin or the integrated study of a region's potentialities;

adaptation of the training for the members of all professions involved in environmental planning:

- firstly, professional people who act directly upon the environment, such as engineers, architects, town and physical planners. It would be necessary to introduce into the existing curricula of training for these professions a set of general notions on the main problems of the environment, together with advanced training in the environmental management techniques associated with each of the professions concerned;

- secondly, professional people such as economists, administrators, planners, political leaders and trade union officials, whose functions involve them in indirect action upon the environment. These should be given a general training through seminars or suitable *ad hoc* courses;

arrangements for permanent training for the members of all the professions mentioned, in view of the very rapid evolution of environmental problems and knowledge;

intensification of extra-mural educational activities relating to environmental management, particularly for rural populations who live by agriculture, animal husbandry and forestry and who thus have a large proportion of biological resources under their management;

adaptation of the training of teachers, at all levels, and community leaders to equip them for their duties as redefined in the foregoing proposals.

Response: 113. In the area of education, the Advisory Committee concurs that all curricula should be revised to include both particular subjects relevant to an understanding of the environment as well as courses

which show the interrelatedness of the natural world and man's interaction with it. The Committee also agrees with the crucial importance of developing special programs to deepen the training and widen the vision both of operational specialists and of decision-makers in the environmental field.

(ii) Recommendations for international action

114. *It is recommended that the Secretary-General, the organizations of the United Nations system, especially UNESCO, and the other international agencies concerned should take the necessary steps to establish an international programme of technical and financial co-operation and assistance in the sphere of general education in favour of the environment and the training of the necessary specialists, technicians and teachers. The exchange of information on systems for teaching environmental subjects and, in particular, the dissemination of the results of educational experiments are an essential feature of such international co-operation.*

115. *It is further recommended that UNESCO, as part of the Programme on Man and the Biosphere and in the course of its general educational activities, should develop its activities concerned with the study of innovations in general education and in specialist training and should encourage the institution of courses and training periods at the regional and international level.*

Response: 114-115. On the international level, the Advisory Committee seconds the recommendation that the various organizations of the United Nations, especially UNESCO, should assist in making training and education in the environmental field available throughout the world. In particular, the Committee supports the exchange of information on various methods for teaching environmental subjects and the dissemination of the results of educational experiments in such teaching.

116. *Lastly it is 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 UNDP through the United Nations Volunteer Corps.*

Response: 116. The Advisory Committee concurs.

C. Public Information and Participation

117. *It is impossible to enlist the participation*

of the public in environmental management without a sustained effort, parallel with the educational campaign, to disseminate information and to develop appropriate institutional machinery. If the citizens are to exercise their responsibilities, they must be not only aware and motivated but also sufficiently well informed of the immediate and long-term problems. All modern techniques

for imparting information can be used in making known events and phenomena which affect the environment.

individual participation is exercised mainly through the normal political process, through a continuous dialogue with the planners and community leaders, and through access to the mass media ;

the solution of environmental problems—which are essentially collective problems but at the same time call into play qualitative notions that are necessarily subjective—is particularly dependent on community forms of social and cultural development. These provide a setting in which to engage in a dialogue for the purpose of defining and giving practical expression to social preferences, and they release latent capacity for action.

(i) *Recommendations for national action*

118. *It is recommended that* the attention of Governments should be drawn to the need to adopt the following measures:

participation in maintaining the flow of information on the environment by all available means (dissemination of the main data collected by public authorities in the form of national reports; local and national campaigns, etc.) and the use of the mass media to educate the public, particularly the rural population, on these subjects;

the establishment of information machinery and machinery for the co-ordination of public responsibilities for education, training and information;

increased public participation in the main channels of mass information;

active encouragement of community activities favourable to the creation of a “good environment”, particularly youth activities (in specialized or non-specialized associations, out-of-school establishments, etc.), by providing continuous material support and adequate facilities (e.g. open-air centres with trained staff);

adaptation and operation of public agencies responsible for environmental management so as to provide for greater participation, and to that end reform, if necessary, of the structure of urban and rural local government.

Response: 117–118. The Advisory Committee agrees that the solution of environmental problems will require both the education and the participation of the general public. To achieve the education of the general public, the Committee agrees that all governments should encourage the flow of information on the environment to the public by all available means (television, radio, press, etc.) and “the establishment of information machinery”—where such does not exist—and machinery for the co-ordination of public responsibilities for education, training and information.” The Committee is likewise favorable to the encouragement of community activities—especially youth—which support the creation of a good government.

(ii) *Recommendations for international action*

119. *It is recommended that* the Secretary-General should make arrangements:

to give the widest possible circulation to the preparatory documents and official documents of the Conference. This task might be performed by the new bodies for environmental co-ordination;

to establish a programme of information on the environment, to be run by a United Nations co-ordinating body in consultation with the national, sub-regional and regional services concerned, for the purpose of assisting States in their efforts to inform the public about current activities and about the solutions applied to environmental problems. In addition this body would compile a catalogue of the methods available in connexion with:

- television programmes on the environment suitable for international transmission;

- radio programmes and popular newscasts for illiterate or semi-illiterate audiences;

- technical experience in the dissemination of information to various sections of the public (information systems in rural areas, information for schools, etc.);

to develop technical co-operation, particularly through and between the United Nations regional economic commissions.

Response: 119. Internationally, the Advisory Committee supports efforts to make the preparatory and official documents of the Conference on the Human Environment widely known, as well as efforts to establish a program of information on the environment for use of the mass media.

120. *It is also recommended that the Secretary-General and the development agencies should make arrangements to use and adapt certain international development programmes so as to improve the dissemination of information and strengthen community action on environmental problems.*

Response: 120. The Advisory Committee concurs.

D. Conservation and Creation

121. The biological cultural heritage must be rationally managed in order to ensure the continuity of development; consequently a large share of resources require dynamic protection. This applies, in particular, to over-exploited species, rare and outstanding natural habitats, landscapes and monuments, and minerals or fossil fuels of which only limited quantities are available.

122. Social and cultural development is expressed by a new planning of the environment and, in the extreme case, by the creation of an entirely new environment. Certain key sectors in which development possibilities are most evident, and areas in which there appears to be a pressing need for development, deserve special attention.

(i) Recommendations for national action

123. *It is recommended that the attention of Governments should be drawn to the need to adopt the following measures:*

the reflection, in social and economic policies, of concern for conservation, in particular of the most valuable features of the environment anywhere in their territory (monuments, sites, rural and urban landscapes, interesting ecological settings, threatened species of fauna and flora, high-quality resources of water and open space, etc.), with due attention to the possibility of signing various international conventions on conservation (enumerated below in the recommendations for international action);

the launching or continuation of pilot schemes based on participation, and mainly:

- the creation and progressive improvement of reception areas for large numbers of migrants from the countryside to major urban areas in the developing countries;

- the creation of urban centres designed to meet human needs and to strengthen the development of a national culture which draws heavily on the past and on innovation;

- a completely new approach to the tourist trade, based on developing it for the real benefit of the local population, on respect for and discovery of the local culture by visitors, and on due attention to ecological data.

Response: 121-123. The Advisory Committee concurs.

(ii) *Recommendations for international action*

124. *It is recommended that Governments, with the assistance of the Secretary-General, FAO, UNESCO and the other international and regional intergovernmental and non-governmental agencies concerned, should continue the preparation of the conventions required for the conservation of the world's natural resources and cultural heritage (monuments, groups of buildings and sites; wetlands of international importance; island ecosystems still undisturbed by human activities; species of wild animals and plants, etc.). 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 wished to save elements of their heritage of universal value would be able to obtain a contribution from the international community to their efforts if need arose.*

125. *It is also recommended that if the draft conventions listed below are already open or are hereafter opened for signature, Governments should make arrangements to examine them with a view to signature:*

- draft convention on conservation of the world heritage;
- draft convention on the protection of monuments, groups of buildings and sites;
- draft convention on conservation of wetlands of international importance;
- draft convention on conservation of certain islands for science;
- draft convention on export, import and transit of certain species of wild animals and plants.

Response: 124 and 125. See Chapter 2, Recommendations 4A and 4B.

126. *Lastly it is recommended that the Secretary-General should make arrangements:*

- to be kept informed of national pilot schemes for new forms of environmental management;
- to assist countries, on request, with their experiments;
- to organize the international exchange of information collected on this subject.

Response: 126. The Advisory Committee concurs.

E. Exchange of information

127. In planning the Conference, the exchange of information about the environment has been a central consideration. Indeed the Conference is itself partly an information gathering and analysis activity in bringing together lines of thought and sources of information, many of which have not previously been in contact.

(i) *Recommendation for national action*

128. *It is recommended that the attention of Governments should be drawn to the need for action to develop and strengthen existing information networks concerned with environmental problems.*

Response: 128. The Advisory Committee concurs.

(ii) Recommendations for international action

129. It has been widely recognized that the development of international recommendations for the improvement of information exchange is difficult because of the diversity of subjects and the variety of users. Discussions in the Preparatory Committee for the Conference and contributions from experts have touched on many problems including those of access to relevant sources of information and of the rationalization of existing information systems. There was also concern over the need to develop techniques for handling socio-economic information and for identifying the real needs of users and in particular of decision-makers.

130. As the tasks are so great, only one of these problems could be chosen at this time as suitable for immediate attack at the international level. It was recognized that there are many initiatives to promote the networking of existing information systems so as to increase their usefulness and to avoid the unnecessary duplication of effort. Because of these initiatives, access to sources of information was identified as the most important problem to be tackled as a beginning and proposals were developed for a modest *International Referral Service for sources of environmental information*. Such a service would enable the maximum benefit to be gained from the exchange of information about local, national and international research, application, and legislative and management experiences in environmental matters.

131. The users of the Referral Service would be governments and bodies of the United Nations system. The Service could be gradually extended to other users, subject to the availability of financial resources. The Service would provide addresses and descriptions of those sources of information most likely to be of help to the user. For developing countries, the Service would provide help in the formulation of questions to the Service and the interpretation of the answers.

132. The Referral Service would cover the five substantive subjects of the Conference agenda: planning and management of human settlements for environmental quality; environmental aspects of natural resources management; identification and control of pollutants and nuisances of broad international significance; educational, informational, social and cultural aspects of environmental issues; development and environment; and, on the other hand, should catalogue all relevant governmental and international sources of

- data ;
- technological and scientific information ;
- social and economic information ;
- legislative, administrative and policy information ;
- public information.

133. The Referral Service would collect, with the assistance and advice of Governments and of the bodies of the United Nations system, the entries which will form its working catalogue of information sources. Each entry to the catalogue would contain the name, address, cable and telephone number of the information source, together with details of controlling body, function, subject coverage, services and availability. These attributes would be sufficiently categorized, indexed and annotated to ensure efficient retrieval.

134. It is now usual for this type of catalogue to be held in a computerized form as this assists up-dating, avoids the need for tedious sorting of entries into alphabetical order, speeds up and extends the capacity for searching and keeps down the requirement for specialist staff. Entries on sources of information would be written on well-designed input forms and categorized, indexed, and edited before being stored electronically. The requests of users would then be organized by the staff of the Service into a search strategy and matched by computer against the content of the catalogue file. The resulting output for the user would consist of a computer print-out listing the sources of information selected for the user's particular requirements. In addition to this customized service it would be possible at a later stage for the Referral Service to publish, on magnetic tape or in book form, edited catalogues covering national, regional, international or subject-based areas of interest.

135. The survey by the Conference secretariat of the relevant information gathering and disseminating systems of United Nations bodies and of some of their clients has shown that an initial catalogue of sources of information could be easily assembled with the assistance and advice of governments. Consultations with the International Computing Centre have shown that the right kind of modern computing facilities for the Referral Service are present in Geneva and that an appropriate terminal is housed in the Palais des Nations. The facilities required by the Referral Service would be well within the existing capacity of the International Computing Centre, whose activities are already paid for in respect of United Nations bodies and would not be charged to the Referral Service. The additional costs of the Referral Service to the United Nations would, therefore, be modest and would only have to cover four to five professional staff with subject knowledge, one information scientist, two reference specialists to formulate questions in the carrier language or languages of the system, one keyboarder and a small clerical support staff.

136. Because the real needs of users and the usefulness of the information they obtain are the only valid starting points for promoting information exchange, it would be necessary to ask users to report back to the Referral Service on which of the information sources they were given were relevant. A well worked out methodology exists for this kind of evaluation. With this feedback, the Referral Service would develop an awareness of the functional network of use which exists between users and producers of information and this knowledge would provide the realistic basis for a more ambitious attempt to co-ordinate information exchange in the future.

137. Accordingly, *it is recommended that* the Secretary-General take action to implement an International Referral Service for sources of environmental information according to the model described in the previous paragraphs, in order to assist in the successful implementation of all the recommendations included

in this Chapter IV subject area IV and of most of those recommendations envisaged within the other four substantive subject areas of the Conference agenda.

Response: 129-137. The Advisory Committee strongly concurs with the recommendations relating to the development of various means for the exchange of environmental information between nations. On the national level, the Advisory Committee agrees with the recommendation of the Conference Secretariat paper and includes under the section on United States Participation in International Programs on the Human Environment additional recommendations of its own. On the international level, the Committee supports the establishment of an International Referral Service to identify sources of environmental information.

Subcommittee 4

Educational, Social, and Cultural Aspects of Environmental Issues

Mr. John Nellor, Chairman

Chairman, Environmental Commission Association of State University and Land Grant Colleges

Assistant Vice President for Research, Michigan State University

Mr. Jules Bergman

Science News Editor

American Broadcasting Co.

Dr. John Chapman, Chairman

AMA Council on Environment and Public Health

University of Texas

Mr. George Harrar, President

Rockefeller Foundation

Mr. Martin Hayden

Editor-in-Chief

DETROIT NEWS

Mr. Laurance Rockefeller

Chairman, Citizens' Advisory Committee on Environmental Quality

Mr. John Ross Vincent

Ecology Center of Louisiana, Inc.

Subcommittee Director

Chauncey Olinger

5. Development

Development and the Environment

INTRODUCTION

The area of Development and the Environment is of critical importance, not only to the deliberations at Stockholm, but to all subsequent discussions about international economic, trade, and environmental policies for years to come. The concept of environmental quality injects a new variable into an already complex world market. The international community is not entirely prepared to deal with this new factor; thus, in the near future it may occasion more conflict than cooperation.

The United States and other developed countries, must support and encourage the efforts of the developing world to integrate the concepts of development and the environment by assuming a fair share of the additional costs incurred. This is not to say that the developed countries should independently assume the responsibility of environmental protection for the developing world; but rather, that we should collectively assume costs which might unduly retard the growth of the developing world.

In addition to sharing the costs of universal improvement of environmental quality, we should take bold initiatives in the area of international investments. Such initiatives will reflect the best interests of the environment abroad as well as the best interests of the economic environment at home. The positions we recommend attempt to reconcile these conflicting interests.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE

1. The United States and other developed countries should support the establishment of international environmental guidelines, criteria, and comprehensive impact statements, with the following requirements:¹

A. Specific products and processes should be tested for their potential effects on the environment, with the results published before production.

B. Environmental programs should be assessed for their impact on the national and international economy.

C. The effects of industrialization on the social and cultural structures of developing countries should be studied.

D. The full range of the anticipated impact of proposed projects should be assessed in the preplanning stage.

E. Improved methods for the adaptation to new technology must be utilized in the developing countries.

2. The United States and other developed countries should support steps in the field of international trade that lead to environmental protection and trade fairness as follows:

A. Government financing should be conditioned upon the filing of an adequate environmental impact statement.

B. Systems of patents and copyrights should be examined to determine whether these rights constitute bars to environmental actions and, if so, how they should be changed. In particular we propose that patentable environmental or pollution control devices should be subject to mandatory cross-licensing, with appropriate compensations, where environmental actions so require.

C. To encourage environmentally sound practices, developed countries should utilize education and persuasion.

D. Developed countries should be willing to assume the major costs of compliance by the developing countries with minimum environmental standards.

E. Multinational accords with respect to a particular industry should involve all supplier and consumer nations.

F. Provisions for temporary governmental assistance should be considered as a response to alternative patterns of trade which may develop as a result of the application of increasingly stringent environmental standards to domestic industries.

G. The United States and other developed countries should export only products which meet the standards imposed on goods sold domes-

¹ See Chapter VI, Advisory Committee Recommendation 6. See Chapter V, Response to UN Report 24.-27; Chapter II, Advisory Committee Recommendation 1.B.

tically and we should import only those products which meet domestic health, safety and pollution standards.

3. The developed countries should adopt the principle opposing exploitation of "pollution havens" and requiring corporate responsibility in meeting at least the best practicable standard of environmental protection.

4. The developed countries should give special attention to the subject of environmental degradation due to lack of development by moving toward the aid target of one percent of Gross National Product and should provide the further aid required for environmental protection.²

DISCUSSION OF THE RECOMMENDATIONS

1. International Guidelines, Criteria, and Comprehensive Impact Statements

It has become evident that there is now a need for a world environmental plan for action which considers global concerns and the relative stages of development of the various participants.

The United States and other developed countries should support standardized environmental appraisals of all bilateral and multilateral development assistance projects, following internationally agreed procedures and standards. Such appraisals will be disseminated for general public consideration prior to implementation of the project. While the appraisals will not be binding on development decisions initially, they will provide greater official and public awareness of possible negative environmental effects and suggest alternative actions to forestall or minimize such effects. Citizens of nations receiving assistance should be involved fully in such appraisals at all stages.

Specifically, we call for an international agreement pertaining to comprehensive environmental impact appraisals which would require:

A. Each nation to test specific products and processes, particularly those involving non-degradable, non-recyclable, or toxic compounds, for their potential effects on the environment, and to publish the results of these tests before introducing the products on the market.

B. A method for assessing environmental programs, which would consider the impact of programs on all facets of the national and international economy.

C. The study of the effects of industrialization on the social and cultural structures of developing countries.

² See Response to United Nations Report 21.-23.

D. Assessment of the anticipated impact of proposed products in the preplanning stage. All aspects—economic, social, cultural, and political as well as physical impact—should be included.

E. Improved methods for the adaptation to new technology must be utilized in the developing countries. The United States and other developed countries have in a particular sense, set a social value system or international guideline for the world: that a nation's success is measured by its ability to produce and consume an endless array of commodities.

In this country, people in government and industry who are responsible for international development must be aware of the major differences of cultural and social values in developed and developing countries. Past and present development patterns of the developed countries might not be the best patterns for the developing countries and, indeed, may be inappropriate. Therefore, it is vital that the latter take the initiative and leadership in decisions that affect their growth.³

2. Environmental Protection and Trade Fairness in International Trade

The United States and other developed countries should require multinational corporations to trade internationally according to sound environmental principles.

A. The filing of an adequate environmental impact statement should be a condition for government loans, investment guarantees, export credits, tax credits, and technical assistance. The National Environmental Policy Act, as enacted, covers these activities and should be implemented accordingly.

B. A full United Nations study of patents, copyrights and other potential barriers to international environmental protection should be conducted. As an early step to ease such barriers, we propose mandatory cross-licensing of patentable environmental or pollution control devices where needed to meet environmental standards, subject to payment of equitable compensation for use of the patent right. This is modeled on a provision in the Clean Air Act Amendments of 1970.

Since industry in some countries will be slower to adopt pollution standards or control devices than in others. The following approaches are warranted to deal fairly with the economic consequences of steps toward environmental protection.

C. Education and persuasion should be utilized by developed countries rather than using economic coercion to encourage environmentally sound practices. Environmental concern should not be used as a pretext for developed nations to erect either tariff or non-tariff barriers.

³ See Chapter VI Advisory Committee Recommendation 6; Chapter II, Advisory Committee Recommendation 1.B. Chapter V., Response to UN Report 24-27.

D. Developed countries should be willing to bear the major cost of compliance by the developing countries with minimum environmental standards. Most of the burden of remedial measures fall on the developed countries because they have the resources and technology to do the job, and they have reaped considerable benefit—in resources and markets—from many of the activities which have caused the damage. Also, the developed countries should be willing to bear the costs of preventive measures in proportion to the benefits they have derived from projects that now require environmental measures. At least in the initial stages, the developed countries may have to assume more than their fair share of the costs until the developing nations are able to assume a greater share of the burdens.

It is unrealistic to suggest that many developing nations can now afford to give environmental concerns a high priority relative to other pressing needs.

Numerous developing countries have tended to view with suspicion the recently heightened concern of the developed nations for their environmental problems. The adoption of strict international standards might cause funds otherwise available for new development projects to be earmarked for remedial and preventive environmental protection projects in countries where the most acute environmental problems are hunger, inadequate housing, insufficient jobs, and lack of educational opportunity. Further, it probably would result in increased dependence of nations which choose the industrial route to development, since almost all of the pollution-control industries are in developed countries.

If the developed countries expect to be taken seriously in their efforts to persuade the developing world of the importance of protecting the natural environment, we must make a more convincing domestic case for our commitment to this ideal. Concurrently, we must actively work to create an international atmosphere in which the developing nations can develop according to their own internally established patterns, priorities, and timetables with minimal dependence on other nations for their economic viability. Until this commitment becomes evident, suggestions that the developing countries avoid our mistakes are hardly believable.

We are aware of the problems created by a unilateral imposition by developed countries of strict domestic standards. There is strong evidence, however, that if similar methods were adopted by the several most developed countries, the deleterious economic effects on each would be minimal. These problems should not be used as an excuse for coercing developing countries who are unwilling to accept strict standards on their own.

E. The developing countries should seek multinational accords, among both supplier and consumer nations, relating to international trade and business, with respect to a particular industry. For example, all the nations involved in copper production and consumption should participate in the development of any such agreements.

F. The developed countries should consider alternative patterns of trade which may result from application of increasingly stringent environmental standards to such domestic industries as pulp and paper. We should recognize that, with international cooperation, existing import and export patterns may have to shift over a period of time. When international trade patterns change suddenly, temporary governmental assistance may be required to soften or reduce the impact of newly imposed environmental standards. Such assistance, in whatever form, should be only for periods of transition.

G. The United States and other developed countries should move toward exporting only products consistent with technology which provides the best available pollution control and with standards equal to those which would apply to products sold domestically, for example in exporting agro-chemicals and automobiles. In addition, as a matter of environmental protection and fairness, United States safety performance and pollution standards should apply to products imported into the United States.

3. The Principle That "Pollution Havens" Should Not Be Exploited

The report to the governments by the Secretary General of the United Nations Conference on the Human Environment⁴ is sympathetic to the plight of the developed countries whose industrial-carrying capacity is near its limit. The report appears to open the door to the acceptability of "pollution havens" in developing countries.

While environmental protection levels are largely a domestic decision not subject to international standards, and a developing country is free to invite polluting industries to its shores, the obligation remains with the imported industry to exercise responsibility with regard to pollution control. When industry from a developed country builds a plant in a developing country, it should meet the best practicable standard of environmental protection. This responsibility also may be enforced by the developed country.

4. Environmental Degradation Due to Lack of Development

It is accepted that an expansion of developed countries' financial participation in development aid programs is justified by the environmental crises which the developing countries face. To do this developed countries should move toward the internationally agreed aid target

⁴ It is recommended that 3 be added to iii, of the United Nations Report "International Distribution of Industry", (A/CONF.48/10).

of one percent of the Gross National Product. This is a mandate to begin attacking world poverty pockets that represent the worst manifestations of illiteracy, lack of sanitation, and malnutrition.

As recommended previously, there should also be additional aid for environmental protection features of projects. We see the need for strengthened technical advisory efforts which should be made available to the principal ministries of developing countries, for example, the ministries of Health, Education, Public Works and Agriculture. Emphasis also should be placed on the development of family planning councils and the introduction of such specific contract projects as small-pox and measles programs carried out by the Communicable Disease Center of Atlanta, Georgia.

RESPONSE TO U.N. RECOMMENDATIONS

Responses of the Advisory Committee to the Recommendations of the Report by the Secretary-General of the U.N. Conference on the Human Environment on "Development and Environment" (A/CONF.48/10)
22 December 1971

21. Most action designed to preserve and improve the environment are necessarily national in character. This is particularly true in the management of human settlements and natural resources. On the other hand, action in other areas, such as marine pollution, can only be taken effectively through international co-operation at the regional or global level. This paper includes only those recommendations for action which are closely related to national development planning and to international economic relations, since other subjects cover recommendations regarding the major sources of national and international environmental degradation.

A. Recommendations for National Action

(i) *Formulation of a new dimension to development strategy*

22. The concern for an improved human environment has emerged at a time when the less industrialized countries are already feeling disillusioned with the pursuit of narrowly conceived economic growth. This affords an opportunity to treat environmental concerns as an added dimension of planning, and not merely as a further claim on limited resources, and to formulate a new strategy of development centred on the elimination of mass poverty and on the creation of a decent human environment. While each country must define its strategy in the light of its own particular problems and stage of development, some of the main elements of such a strategy can be identified.

23. *It is recommended that* in formulating strategies for development, the attention of governments be drawn to the need to take account of the following elements:

development policies should include a selective attack on the worst manifestations of poverty. Development goals and targets should be expressed in terms of a progressive reduction and eventual elimination of malnutrition, disease, illiteracy, squalor, unemployment and inequalities. While the GNP may serve as a convenient summation of all other targets, greater attention must be paid to its contents and elements;

consumption targets which could be reached in a reasonable period of time should be set. Those targets should be expressed in terms clearly directed to achieving environmental conditions basic to human health and well being by eliminating the worst manifestations of poverty, such as nutritional, educational, health and housing deficiencies. Environmental criteria should also be established for various sectors, such as health, nutrition, water supply, sanitation, soil conservation, land management, rural-urban interaction patterns, and the location and planning of new urban settlements;

appropriate machinery should be set up to deal with environmental problems and should be integrated, or closely linked with the machinery for overall development planning and implementation;

specific environmental goals should be incorporated in the process of regional and physical planning.

Response: 21-23. The Advisory Committee strongly concurs. See this Chapter, Advisory Committee Recommendation 4.

(ii) *Formulation of guidelines for project appraisal*

24. The integration of environmental goals with development policies will also involve a revision of guidelines for project appraisal, to take account of environmental considerations. More particularly, decisions will be required on what social costs or benefits should be considered, how they should be measured, and at what rate future costs should be discounted.

25. It is important to ensure that such new guidelines are appropriate to conditions prevailing in the countries concerned and formulated at the national level. They should not be established in abstract or general terms. Their relevance or applicability should not be assumed but should be demonstrated on a case by case basis. The formulation of appropriate appraisal and evaluation criteria will take time, and care must be taken that the flows of international aid and investments are not slowed down in the interval through the application of criteria established by multilateral or bilateral donors without adequate consultations with the less industrialized countries.

26. The establishment of adequate procedures for project design and appraisal presupposes a better knowledge of the environmental impact of development projects. Environmental pre- and post-audits of such projects are, therefore, often necessary to feed those in charge of projects with adequate data so that preventive and remedial action can be taken. Post audits should be supported, when necessary, by financial and technical assistance from international agencies.

27. *It is recommended that* the attention of governments be drawn to the need for action to ensure that:

Governments take the initiative in establishing environmental guidelines and criteria for project appraisals;

Governments in formulating these guidelines, seek the assistance, if necessary, of outside agencies concerned with development;

the guidelines be discussed at a later stage at the regional and international levels to achieve a broad consensus.

Response: 24-27. The Advisory Committee concurs. See this Chapter, Advisory Committee Recommendation 1.

(iii) *Collection of basic information*

28. The successful integration of environmental and developmental concerns will require a good deal of additional information which is not presently available to development planners.

29. *It is therefore recommended that* the attention of governments of the developing countries be drawn to the need to give priority to:

conducting surveys of the present state of the environment and of the major hazards to which it is likely to be exposed in the process of development, to help determine environmental policies within the framework of economic and social planning;

conducting studies and surveys to determine the extent to which the environment is affected by mass poverty, malnutrition, housing shortage, inadequate water supply, disease and illiteracy. These studies and surveys should be used in the formulation of social and economic plans;

reviewing existing legislation available to implement national environmental policies and objectives, and determining what new legislative actions are necessary in light of this review;

analysing studies and experiences of other countries which are developing environmental programmes and policies and are applying new administrative and technological approaches to pollution control.

Response: 28-29. The Advisory Committee concurs.

B. Recommendations for international action

(i) *Regional co-operation*

30. The major role that United Nations and other regional organizations can play in helping Governments to establish an appropriate balance between the concerns of environment and development lies in organizing research, in training personnel, in arranging for the exchange of information and in providing technical and financial assistance above the levels indicated in the International Development Strategy.

31. Accordingly, *it is recommended that* regional organizations give full consideration to each of the following steps:

preparing detailed plans for the study of major environmental problems faced by the countries of the region concerned as well as of the special problems of sub-regional and regional interest of the land locked and least developed countries of the region and of countries with coast lines particularly exposed to the risk of marine pollution;

examining possible administrative, legal and technical solutions, to such problems in terms of both preventive and remedial actions, including alternative approaches to development projects;

increasing and facilitating the flow of information and experience to member countries through global and regional co-operation with particular emphasis on an international information referral centre approach;

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;

encouraging 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;

establishing criteria, concepts and a terminology of the human environment through interdisciplinary efforts;

establishing and disseminating information on the significant environmental problems of each region and the nature and result of steps taken to cope with them;

providing and co-ordinating technical assistance activities directed at establishing systems of environmental research, information and analysis at the national level;

assisting developing countries in co-operation with appropriate international agencies, in developing and applying low cost methods for improving health, housing, sanitation and water supply. Emphasis should be devoted to labour intensive measures and methods utilizing local materials.

Response: 31. The Advisory Committee concurs.

(ii) *International trade relations*

32. In order to ensure that the growing concern with the environment does not lead to major disruptions in international trade, *it is recommended that* governments take the necessary steps to ensure 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;

where environmental concerns lead to restrictions on trade, or to stricter environmental standards with negative effects on exports, particularly from de-

veloping countries, appropriate measures for compensation should be worked out;

the GATT 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 multi-lateral adjustment of differences;

whenever possible (i.e. 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. Assistance in meeting consequences of stricter environmental standards ought to be given in the form of financial or technical assistance for research with the aim to remove the obstacles that the products of developing countries have encountered;

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. Environmental standards should be established at whatever levels are necessary, to safeguard the environment and should not be aimed at gaining trade advantages.

Response: 32. The Advisory Committee concurs.

33. *It is also recommended that the Secretary-General ensure that:*

appropriate steps be taken by the existing UN organizations to identify the major threats to exports that stem from environmental concerns, their character and severity, and the remedial action that may be envisaged;

the United Nations system assist governments in negotiating, in as many areas as possible, mutually acceptable international environmental standards on products so as to reduce the scope for arbitrary or discriminatory actions.

Response: 33. The Advisory Committee concurs.

34. *It is further recommended that:*

GATT and UNCTAD should consider undertaking to monitor, assess and regularly report the emergence of tariff and non tariff barriers to trade as a result of environmental policies.

Response: 34. The Advisory Committee concurs.

(iii) *International distribution of industry*

35. The need of developing countries to establish certain basic industries (petroleum and chemicals, metal extracting and processing, pulp and paper and others) coincides with a growing concern of industrialized countries for the environmental degradation which rises from heavy concentration of such industries in their countries. These provide a new reason for re-examining the factors which determine the location of industries internationally, and, in turn, opens up new opportunities and new risks for developing countries. The capacity of the natural environment to absorb and dissipate waste without suffering intolerable damage must now be regarded as an economic resource. Since the less industrialized countries have by and large put lighter burdens on their environment re-

sources than the industrialized countries and may therefore be able to afford less stringent environmental standards, this could give them a comparative advantage in the establishment of certain new industries. Such new activities could have a significant impact on development through increasing income, productivity and employment which would subsequently increase the ability of the countries concerned to improve the environment. However, countries in considering such opportunities should also take full account of the potential risk of environmental damage which might affect development gains. In many cases it should be possible to avoid or mitigate such risks by adequate planning, locations and use of proper technologies. In order to avoid the indiscriminate import of pollution, developing countries could enforce environmental standards to achieve minimal levels of industrial pollution in the light of their stages of development and of their cultural and social objectives.

36. In the light of the above, *it is recommended that:*

Governments of the developing countries consider fully the new opportunities which may be offered to them to establish industries in which they may have comparative advantages due to environmental considerations, and that special care be taken in all such instances to avoid the creation of pollution problems in developing countries;

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 and to minimize risks in this area.

Response: 35-36. The Advisory Committee disagrees with the spirit of this initial paragraph which emphasizes the relatively large environmental carrying capacity of a developing country, and the statement that such countries are therefore able to afford less stringent environmental standards. This appears to open the door to possible abuse in the form of "pollution havens". We recommend that these paragraphs be deleted. See this Chapter, Advisory Committee Recommendation 3.

(iv) *International financing for environmental action*

37. Environmental policies pursued nationally and internationally are likely to have repercussions on flows of resources and other factors affecting development. It is important that the Conference endorse the concept of international responsibility for the international aspects of environmental action.

38. Accordingly, *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 the General Assembly resolution 2849 (XXVI).

Response: 37-38. The Advisory Committee concurs.

39. *Recognizing* that it is in the interest of all mankind that technologies for protecting and improving the environment be employed as universally as possible it is recommended that the Secretary-General be asked to undertake studies in consultation with governments and appropriate international agencies to study means by which governmental technologies may be made available to developing countries under conditions which encourage their wide distribution.

Response: 39. The Advisory Committee concurs.

(v) International development strategy

40. *It is recommended that* the Secretary-General (in collaboration with appropriate international agencies) take steps to ensure that the environmental considerations set out here be taken into account during the review and appraisal of the International Development Strategy for the Second Development Decade.

Response: 40. The Advisory Committee concurs.

Subcommittee 5

Development and Environment

Mr. John Ross Vincent, Chairman Ecology Center of Louisiana, Inc.

Dr. John Chapman
Chairman, AMA Council on Environ-
ment and Public Health
University of Texas
Mr. John D. Harper

Chairman of the Board, ALCOA
Gordon K. Zimmerman
President, National Association of
Conservation Districts

Subcommittee Director

Carl B. Harris

6. Institutional Arrangements

Institutional Arrangements and the Declaration on the Human Environment

INTRODUCTION

Much of the success of the Conference on the Human Environment will be determined by the institutions which it creates. After the Conference is concluded, it will only be through effective organizational arrangements that substantive proposals can have operational reality.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE

1. A strong, high-level executive for environmental affairs, with broad terms of reference, should be established in the office of the Secretary-General of the United Nations.¹

2. A United Nations Voluntary Fund for the Environment, with a minimum annual budget of \$100 million, of which \$50 million shall be designated for the Division of Human Settlements, to be administered by the environmental executive, should be established.

3. UN environmental activities require an adequate source of funding. Serious consideration should be given to a system of national assessments, based upon each nation's rate of energy consumption.

4. A United Nations Intergovernmental Body for the Environment as a subsidiary of the General Assembly should be established.²

¹ See Chapter 2, Advisory Committee Response to United Nations Recommendations 46.-48., 66.-67; Chapter 3, Advisory Committee Recommendation 1.

² See Chapter 3, Advisory Committee Recommendation 2.

5. Interdisciplinary, international scientific advice on the environment should be institutionalized.³

6. An international equivalent to environmental impact statements should be initiated.⁴

7. Universality of participation in the Conference on the Human Environment is endorsed.

8. New treaty formation procedures should be adopted.

9. Adequate measures for treaty enforcement and dispute settlement should be developed.

10. The role of regional organizations, in carrying out a variety of functions dealing with the environment, should be enhanced.

11. Continuity of action in the period immediately following the Conference and before the next meeting of the General Assembly should be encouraged.

DISCUSSION OF THE RECOMMENDATIONS

1. A Strong Executive for Environmental Affairs with Broad Terms of Reference

The single most critical factor in international environmental institutional arrangements for the post-Conference period will be a United Nations executive for environmental affairs. International environmental action should be centered in the United Nations. And, within the United Nations, a high-level executive should be the center of environmental activity.

The report to the governments by the Secretary-General of the United Nations Conference on the Human Environment⁵ places primary emphasis upon an intergovernmental body. And it speaks of an executive office as "servicing" this intergovernmental body.

It is our conclusion that these priorities should be reversed and that primary emphasis must be placed upon a strong executive. There should be an intergovernmental body, but its purpose should be to advise and support the executive and not to receive his services.

An executive for environmental affairs could bear any of several titles: High Commissioner, Under Secretary-General, Administrator. Regardless of the title given him, he should be placed at the highest possible level in the United Nations administrative structure, i.e., in the Office of the Secretary-General. His exact position should be deter-

³ See Chapter 4, Advisory Committee Recommendation 4.

⁴ See Chapter 2, Advisory Committee Recommendation 1B; Chapter 5, Advisory Committee Recommendation 1.

⁵ "International Organizational Implications of Action Proposals," Subject Area VI (A/CONF.48/11, Jan. 10, 1972).

mined by that which will provide the office with maximum prestige, strength, and freedom.

This officer should be supported by a staff of the highest degree of competence. The staff need not and should not be large, but it should be of excellent quality.

The executive officer should be charged with a number of functions and responsibilities, the chief of which should be to stimulate the nations' concern for and action on behalf of environmental enhancement and protection. To this end, the environmental executive should be empowered, by the broadest possible terms of reference short of enforcement, to initiate consultations with governments. And he should also be empowered to go directly to the people of the nations.

A further function of the executive should be that of linking the environmental activities of United Nations agencies, of governments, and of nongovernmental groups. To insist upon an Environmental Coordinating Board, as has been proposed, instead of enabling the executive officer to create his own mode of linkages, might limit his options and freedom and add to administrative confusion. If there is to be a coordinating unit, it should either be advisory or act as an arm of the executive office. It should be available to support the environmental executive but should not exercise power over him.

An active, resourceful, creative leader should be recruited for the office of environmental executive. Among his tasks, besides those already discussed, should be the following, not necessarily listed in order of priority:

To consult with regional groups, as well as nations, concerning environmental measures, goals, and standards.

To identify and focus attention upon environmental problems and possible solutions.

To consult with the international science advisory service.

To administer the United Nations Voluntary Fund for the Environment.

To encourage the environmental activity of intergovernmental and nongovernmental groups.

To develop policy and guidelines with the advice of the United Nations Intergovernmental Body for the Environment.

To encourage nations to enter environmentally protective agreements with each other.

To provide advisory and good offices for dispute settlement.

To call together and/or contract with ad hoc groups of experts.

To promote public awareness and education.

To promote technical cooperation among nations.

To establish a global monitoring system.

To provide for the gathering, assessment, and sharing of data.

2. *United Nations Voluntary Fund for the Environment*

In his annual Environmental Message to the United States Congress on February 8, 1972, President Nixon noted that the Stockholm Conference "should be a seminal event of the international community's attempt to cope with the serious, shared problems of global concern that transcend political differences."

He went on to propose the creation of a "voluntary United Nations fund for the environment" with initial funding of \$100 million over a five-year period. The President said that, if such a fund is established, he will "recommend to the Congress that the United States commit itself to provide its fair share."

The Advisory Committee endorses the establishment of a United States Voluntary Fund for the Environment. We recognize the value of President Nixon's pledge of United States participation in a fund of \$100 million for 5 years to insure that the Stockholm Conference proposals will have the necessary financial footing. Nevertheless, we consider this only an opening bargaining figure. Rough estimates on the costs of our proposals indicate that *\$100 million a year* for the first 5 years could be well spent, \$50 million of which would go to a Division of Human Settlements, with the lion's share of the remaining \$50 million going towards establishing and operating a global monitoring network. These costs can be expected to increase over time as the programs move from research and organization to action. To put the \$100 million in perspective, we should note that our own Environmental Protection Agency spends five times this much a year on administrative costs alone, apart from such items as construction grants.

The interdependence of all men and nations requires that the United Nations meet such a modest funding requirement. The United Nations should annually report on the budgetary requirements of its environmental programs, and the United States should be prepared to deliver one-time-only lump sums to ensure that vital international environmental efforts do not fall by the wayside from fiscal starvation. United States participation in this Fund should be exemplary and a reflection of the fact that we are the world's major polluter.

The Fund should be administered by the executive officer, with the advice and review provided by the Intergovernmental Body. It should be devoted to projects, studies, and "seeding." Added costs for environmental measures, in such matters as development projects, should not come from this fund. Costs of operating and administering the environmental executive office might come from or be supplemented by this Fund.

An adequate minimum contribution to this Fund by the least developed nations, which are only minor sources of industrial pollution,

might be \$1,000. Participation in the Fund by the smaller nations should be encouraged as a means of emphasizing that all have a stake in international environmental protection. Much larger participation should be expected from the major polluters in the international community of nations.

3. Energy Consumption Formula

A nation's negative impact on the environment can be judged approximately by its consumption of energy. And those who pollute the most should pay the most for environmental restoration and enrichment. Therefore, the environmental executive should explore the possibility of a system of funding United Nations' environmental work in which the nations which consume the most energy would make the largest contribution to the Fund.

As mentioned above,⁶ those countries which are relatively small consumers of energy would pay a nominal amount, perhaps a minimum of \$1,000. Those countries which are large consumers of energy would be asked to contribute on an escalating curve which would place upon them the brunt of funding (i.e., the United States, the Soviet Union, Japan, and the industrialized countries of Western and Eastern Europe).

A formula derived from each nation's consumption of energy could provide the basis for the suggested participation in the United Nations Voluntary Fund for the Environment. Or, it might provide the basis for a long-range system of funding, which could be a matter of assessment rather than voluntary participation. This proposal, as well as those recommended in Chapter II, should be considered in the proposed study of means of financing environmental measures.

4. A United Nations Intergovernmental Body for the Environment as a Subsidiary of the General Assembly

The Secretary-General's report presents two broad alternatives for the location of an intergovernmental body within the United Nations organization: as a subsidiary of the General Assembly (pursuant to Article 22 of the Charter of the United Nations) or as a subsidiary of the Economic and Social Council (pursuant to Article 68 of the Charter).

There are compelling arguments for either option. The proposal which incorporates the best aspects of each is to create an intergovernmental environmental body as a subsidiary of the General Assembly but to provide that it shall report to the General Assembly and concurrently to the Economic and Social Council (ECOSOC).

⁶ See Section 2 above.

This unit will bear such importance for the world that its vitality and potential—and not the vitality of, or long-range plans for, the ECOSOC—should determine where it is placed in the organizational structure. The proposal to make it a subsidiary of the General Assembly, reporting both to the Assembly and to ECOSOC, would accord well with attempts to strengthen ECOSOC, at the same time, the importance and developing role of the environmental body would not be limited. Future changes in its organizational placement would always be possible.

The point is that the intergovernmental body should be placed at the highest level in the United Nations; its functions should not be scattered through several administrative levels. It should enjoy the prestige and public visibility which its subject deserves. And it should be open to future shaping as new courses of action are suggested by expanding knowledge and political capability. Furthermore, the environmental executive should be supported and advised by an intergovernmental body which has the highest authority and standing; his prestige and authority should be buttressed by a strong advisory body.

For all the attractiveness of the option whereby the intergovernmental body would be made a subsidiary of ECOSOC, to place this body under ECOSOC would be to place it in serious jeopardy.

The composition of the intergovernmental unit should be patterned after the model of the 27 member Preparatory Committee which has advised the Secretary-General in preparation for the Stockholm Conference. This Committee exhibits a fruitful geographical and interest distribution, and yet it is not so large as to be ineffective.

Among the functions of the Intergovernmental Body for the Environment would be the following, again listed not necessarily in order of priority:

To support and advise the environmental executive.

To propose to the General Assembly a Declaration on the International Law of the Environment (as a complement to the Declaration on the Human Environment and analogous to the Declaration on Friendly Relations).

To review policy and guidelines.

To review administration of the United Nations Voluntary Fund for the Environment.

To recommend the convening of further Stockholm-type conferences or special ad hoc meetings of nations.⁸

⁷ See Chapter 5, United Nations Recommendation 37.

⁸ See also Chapter 1, Advisory Committee Recommendation.

5. *A Scientific Advisory Service*

One of the major tasks facing the environmental executive will be development of close working relationships with the international scientific community. The Secretary-General's report proposes that this task be accomplished by convening groups of experts on an ad hoc basis. It notes that there have been proposals for a single panel of scientific advisers but finds that these proposals are still in a germinal stage and are not well enough developed for action at this time.

We are of the firm conviction that, while ad hoc panels may properly be convened and utilized by the environmental executive, there must also and primarily be a fixed locus for international scientific research, assessment, and advice. The Conference should make provision for the institutionalization of international scientific advice. Among the proposals already advanced for this type of service are the World Environmental Institute (United States Senate Resolution 399, October 1970), an International Center for the Environment (Report of the Ad Hoc Committee of the International Council of Scientific Unions on the Problems of the Human Environment), and a Global Environmental Science Advisory and Research Board (Report to the Department of State by the Committee for International Environmental Programs, National Academy of Sciences). These proposals have several characteristics in common. We specifically suggest the following:

The scientific advisory service would be chartered by governments but organized and operated by the international scientific community. It would be outside the United Nations system but would be available to the United Nations environmental executive. The precedent for the type of relationship we are suggesting is that of the relationship of the National Academy of Sciences to the United States Government.

While the proposed locus of scientific advice does not lie within the United Nations system, we urge that it be included in the Stockholm agenda. In this way, the international scientific community might be encouraged to act. And the United Nations efforts will be saved from lapsing permanently into the practice of assembling temporary panels, which might perpetuate the present state of fragmented and sectionalized research.

The advisory service should be fully interdisciplinary. The social sciences should be included. Means for involving the humanities should be sought. The service should act as a nongovernmental, scientific counterpart to emerging intergovernmental structures. It should, at first, have a small staff for research and an administrative apparatus that is not unwieldy.

Composition of the service would be determined by the international scientific community. Initially, the task of this institution should be

to constitute itself, to form working relationships with the United Nations environmental executive as well as other offices and bodies within and without the United Nations, and to provide for resources.

Funding should be received from several sources: The United Nations Voluntary Fund for the Environment (on a contractual or ongoing basis); national governments; voluntary contributions from foundations; use of existing facilities and shared personnel.

Possible functions of this service might be:

To analyze the effects of interactions between man and his environment.

To assess specific problems as well as the general state of the environment.

To help establish priorities in research and action.

To link the scientific environmental activities of countries where they are underway and to encourage indigenous activities where they are not.

To assist in creating a world monitoring network.

To investigate alternative ways of modifying ecosystems for the enhancement of the human condition (including economic gain).

To catalyze a diversity of environmental research.

6. International Environmental Impact Statements

Principle 20 of the Draft Declaration on the Human Environment states:

"Relevant information must be supplied by States on activities or developments within their jurisdiction or under their control whenever they believe, or have reason to believe, that such information is needed to avoid the risk of significant adverse effects on the environment in areas beyond their national jurisdiction."

This is a good statement as far as it goes, but it does not go far enough. The principle should be expanded to express the double-faceted obligation to consider and make known the potential environmental impact of proposed actions, on the one hand, and, on the other, to be open to prior consultations before undertaking acts with likely environmental impact on other jurisdictions or on common media. That is to say, there is an obligation to give information and an obligation to take into account the reactions of others to that information.

We believe that this double obligation should be given definite expression. And we recommend that concrete means be developed for putting it into operation in the form of environmental impact statements, i.e., an international equivalent to the Sec. 102(2) (c) statements required by the United States National Environmental Policy Act.

Such statements should be made by international agencies and multinational corporations as well as by nations.

The realization of the goal of international environmental impact statements lies along a path marked with pitfalls. Certainly, the administration of impact statements could become so cumbersome as to render them meaningless and ineffective. Initial hostility to the concept of international impact statements is not unlikely and will have to be worked through. Furthermore, there is presently no realistically effective method for eliciting impact statements from all who should file them, nor is there appropriate machinery for encouraging alterations in proposed actions to account for objections raised on the basis of impact statements.

Nevertheless, in spite of the multiple complexities which would confront it, a workable system of international environmental impact statements would be invaluable, and a start should be made. It would generate awareness of the environmental consequences of actions, provide an avenue for public involvement and interest, serve as a focal point for consultation, and give occasion for the sharing of technical assistance.

We recommend that first the principle be stated—the double obligation to give information and to take into account reactions to it—and then a beginning be made on a system of international environmental impact statements.

One starting point would be the voluntary filing of impact statements, with the United States taking the lead and encouraging other willing countries to join with it on an experimental basis. The expectation would be that the practice would become common and established.

International environmental impact statements should not be conceived as covering all possible activities and certainly not those which are purely local. They should also avoid serving as a pretext for unwarranted interference by one country in the internal affairs of another, especially interference by the strong in the affairs of the less strong.

The statements could be filed with the office of the United Nations environmental executive. A modest system would suffice at first. A fuller program could follow initial experimentation. The statements should be open for comment not only by governments but also by the public (conservation groups, scientific bodies, and the like). The model is the filing of impact statements with the Council on Environmental Quality.

7. Universality of Participation

Universality of participation in the Conference on the Human Environment is a complicated issue which is not, strictly speaking,

part of the institutional arrangements which will result from the Conference.

However, the Committee feels constrained to express its view that the environmental crisis is universal and should elicit a universal response. It would be most regrettable if all nations, especially the industrialized nations of the Socialist bloc, were not in attendance at this Conference.

The Committee urges that the political issue of participation by all not be allowed to jeopardize the success of the Conference and fervently hopes that participation will be universal.

We strongly recommend that the United States do all it can to achieve universality of participation in the Stockholm Conference and in any subsequent environmental conferences, treaties, and actions.

8. New Treaty Formation Procedures

In the international arena, the development of conventions represents the formalization of agreed upon views and approaches by nations of varying cultures, political systems, economic structures, and social values. Clearly, agreements derived from such diversity may result in substantial compromise of national positions. In the environmental area, this means that international standards may be weaker than the United States standards. Therefore, we recommend two approaches to international environmental conventions: first, that the United States maintain the highest standards even if it is a party to a convention with weaker standards; and second, that the United States only become a party to conventions which will permit it to retain its own standards if the international standards are weaker.

Furthermore, we recommend that the United States place its political and economic power at the disposal of its negotiators on environmentally oriented conventions to the same degree that it does for an arms limitation convention and trade agreements. The United States should be the prime advocate for effective environmental accords and should accordingly develop its strongest position—and not just an acceptable position—for presentation to the international community.

Another element in the development of international conventions by the United States involves the timeliness of citizen input. Although these treaties are subject to ratification by the United States Senate, it is clear that the time for meaningful participation has passed when the convention is approved by several nations. For example, the Senate can only fail to ratify a treaty it does not concur with, while it cannot amend it. We strongly endorse allowing adequate time for the preparation of treaties and involving the citizens of the United States at the earliest stages in development of American positions and draft conventions. This participation must occur during early drafting stages

and not await Executive Branch decisions about basic policies or specific treaty language. One way of doing this is to have the appropriate Senate and House Committees hold hearings on the subject of a given treaty well in advance of any final decision on positions.

9. Treaty Enforcement and Dispute Settlement

The incorporation of appropriate methods for carrying out covenants, for providing independent monitoring, and for imposing timely penalties or other sanctions should be incorporated in all treaties adopted for environmental protection and enhancement. An example of a convention which does not incorporate such appropriate methods is that on the Conservation of Antarctic Seals, which makes no provision for efficient monitoring of compliance with its terms. In spite of this failure of the treaty, the United States, while recognizing the failure in an addendum, still became a party to the convention. The United States should insist on more stringent measures of enforcement instead of adding its blessing to inadequate ones.

Treaties should also include provision for the settlement of disputes arising under them. Of course, there will be disputes arising out of environmental matters not governed by treaty. With respect to these, the Secretariat report notes that the procedures outlined under Article 33 of the Charter of the United Nations could be adopted. The Advisory Committee recommends that the United States specifically agree to Article 33 procedures in environmental disputes.

We also recommend, as the Secretariat report suggests, that use be made of the advisory and good offices of the environmental executive, as well as non-judicial arbitral panels where appropriate and the chamber procedure of the International Court of Justice.

In addition, we assume that the environmental executive would take an active role in consultation with governments (and others) about violations or possible violations of agreed upon environmentally protective procedures and standards.⁹

10. Regional Organizations

The Secretariat report recognizes that "many of the conditions affecting the environment have a distinctly regional character, and, therefore, the specific problems of each of the regions of the world will often respond best to a regional approach."

As the report goes on to note, there can be no standard format for regional environmental organizations since different locales and problems will require different organizational patterns. There is, however,

⁹ See Chapter 6, Advisory Committee Recommendation 1 and 6; Chapter 2, Advisory Committee Response to United Nations Recommendations 46.-48., 66.-67.; Chapter 3, Advisory Committee Recommendation 1; Chapter 5, Advisory Committee Recommendation 1; Principles of the Declaration on the Human Environment.

one factor which should be common to all regional groupings: the states directly concerned should be involved.

There are already four United Nations regional Economic Commissions and a variety of other functionally oriented regional groups, both large and small, all of whose efforts warrant attention and support.

We recommend that the United Nations, under the leadership of the environmental executive and through the regional commissions, survey existing problems shared by regional organizations, enable them to meet together to review their common problems, to exchange methods of solution, and to plan for strengthening their organizational capabilities to meet environmental problems.

We also note that, while an environmental problem may be global and not regional, its solution may require what essentially would be regional or local action. The end of worldwide ocean pollution, for example, will require many local actions. Therefore, we recommend that regional efforts to protect threatened bodies of water be encouraged by the Conference on the Human Environment and that, where appropriate, other regional responses to global environmental problems also be encouraged.

It bears pointing out that, among the coordinating or linking responsibilities of the environmental executive, there should specifically be included the authority to link the environmental activities of regional organizations.

11. Initiatives in the Period Immediately Following the Stockholm Conference

The Stockholm Conference will make recommendations to the General Assembly of the United Nations. There will be an interregnum between the conclusion of the Conference and the meeting of the General Assembly which will consider these recommendations.

This interval could make for a breach in the continuity of international environmental initiatives. Or it could be a period in which Conference decisions might, where appropriate, be implemented or other efforts continued which have been started in the course of preparation for the Stockholm Conference.

We believe the period immediately following the Conference should be seized as an opportunity for continuing and expanding the good work already done. The hopeful momentum toward international environmental action should not be allowed to be suspended in this period.

The necessary steps to be taken after Stockholm and before the next General Assembly will require funds and personnel. Therefore, we recommend that the United States insure that momentum is not

lost in the period immediately after the Conference because of a lack of funds by the Secretariat of the United Nations Conference on the Human Environment.

12. United Nations Recommendations

No recommendations were made in the Secretariat paper in this area.

DISCUSSION OF THE DRAFT TEXT OF THE DECLARATION ON THE HUMAN ENVIRONMENT

The Advisory Committee is well aware of the nettlesome complexities of producing a negotiated Declaration on the Human Environment to which more than 130 nations can and will subscribe. But the Committee is also mindful of the mandate from the General Assembly of the United Nations that the Declaration "inspire and guide the peoples of the world."

As it now reads, the Draft of the Declaration does contain laudable goals and principles. We would not elide any of them. The shortcomings of the Draft are that more needs to be said and that what has been said should be more artfully worded. The need is for a stylistically graceful document which expresses the full range of aspirations and principles.

Response to the Draft Text of the Declaration on the Human Environment

Draft texts of a preamble and principles of the Declaration on the Human Environment

PREAMBLE

The United Nations Conference on the Human Environment, Having met at Stockholm from 5 to 16 June 1972, and

Having considered the need for a common outlook and common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment,

PROCLAIMS

1. Man is both creature and moulder of his environment. His physical needs and capacities are conditioned by age-long evolution in his terrestrial home. But his intellectual and his social and moral nature have set him free from time immemorial to transcend and transform wild nature and to build his own society and culture, and thereby create for his progeny a better and more fully human life. Both aspects of man's environment, the natural and the man-made, are essential to his well-being and to the enjoyment of basic human rights—even the right to life itself.

2. Man has constantly to sum up experience and go on discovering, inventing, creating and advancing. In our time he has acquired, through the accelerating advancement of science and technology, the power to transform his surroundings in countless ways and on an unheard of scale. Used wisely, this power can bring to all peoples the benefits of development and the opportunity to enhance the quality of life. Wrongly or heedlessly applied, the same power can do incalculable harm to the human environment. We see around us growing evidence of man-made harm in many regions of the earth: dangerous levels of pollution in water, air, earth and living things; major and undesirable disturbances to the ecological balance of the biosphere; destruction and depletion of irreplaceable resources; and gross deficiencies in the man-made environment of human settlements.

3. In our time also, the growth of population in certain areas, through both migration and unprecedented natural increase, has accelerated to rates which could frustrate all efforts to conquer poverty and under-development and to maintain a decent human environment, whereas other areas have not yet reached population density conducive to economic efficiency and the high productivity that will permit the rapid increase of standards of living.

4. Meanwhile immense resources continue to be consumed in armaments and armed conflict, wasting and threatening still further the human environment.

5. Thus a point has been reached in history when we must shape our actions throughout the world with a more prudent care for their environmental consequences. Through ignorance or indifference we can do massive and irreversible harm to the earthly environment on which our life and well-being depend. Conversely, through fuller knowledge and wiser action, we can achieve for ourselves and our posterity a better life in an environment more in keeping with human needs and hopes. What is needed is an enthusiastic but calm state of mind and intense but orderly work. For the purpose of attaining freedom in the world of nature, man must use knowledge to build in collaboration with nature a better environment. To defend and enhance the human environment for present and future generations has become an imperative goal for mankind—a goal to be pursued together with, and in harmony with, the established and fundamental goals of peace and of world-wide economic and social development.

6. To achieve this environmental goal will demand the acceptance of responsibility by citizens and communities and by enterprises and institutions at every level, all sharing equitably in common efforts. Individuals in all walks of life as well as organizations in many fields, by their values and the sum of their actions, will shape the world environment of the future. Local and national governments will bear the greatest burden for large-scale environmental policy and action within their jurisdictions. A growing class of environmental problems, because they are regional or global in extent or because they affect the common international realm, will require extensive co-operation among nations and action by international organizations in the common interest.

Principles

STATES THE COMMON CONVICTION THAT¹⁰

1. Man has the fundamental right to adequate conditions of life, in an environment of a quality which permits a life of dignity and well-being and bears a solemn responsibility to protect and enhance the environment for future generations.

Response: 1. To Principle #1 there should be added: "The ultimate measure in environmental matters ought to be the furtherance of the development of life and of man's potential for life."

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

Response: 2. Principle #2 should include the declaration of common media (air and water) as a common trust.

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

4. The non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion.

5. The discharge of toxic substances, or of other substances in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be checked to ensure that serious or irreversible damage is not inflicted upon ecosystems.

Response: 5. Principle #5 should conclude by reading: "human health and well-being as well as ecosystems." instead of simply: "ecosystems."

6. 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.

Response: 6. Principle #6 should include: "the unequal distribution in the world of wealth, power, and opportunity is a serious factor in the world's environmental disorder."

7. Environmental deficiencies generated by the conditions of under-development pose grave problems and can best be remedied by and in the course of development.

8. The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries or hamper the attainment of better living conditions for all and appropriate steps should be taken by State 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.

Response: 8. Principle #8 should begin: "Since it is in the self-interest of States to improve themselves by helping to improve others, the environmental policies . . ."

9. Resources should be made available to preserve and enhance the environment, taking into account the particular requirements of developing countries and any costs which may emanate from their incorporating environmental safe-

¹⁰ Note: The order in which the paragraphs appear was not discussed and is therefore provisional and subject to change.

guards into their development planning and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose.

10. Relevant environmental considerations should be integrated with economic and social planning to ensure that development plans are compatible with the need to protect and enhance the environment.

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

12. Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits.

13. 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 enhancement of the human environment and impede development.

14. 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.

15. Science and technology must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems, in the furtherance of economic and social development.

Response: 15. Principle #15 should be changed to read: "A unified approach by the sciences, technologies, arts, and humanities—leavened by public participation—must be made toward the identification, avoidance, and control of environmental risk; toward creative solutions to environmental problems, and toward optimum environmental quality, in the furtherance of economic and social development."

16. Education in environmental matters, especially for the younger generations, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and enhancing the environment.

17. Research and the free exchange and transfer of scientific and other knowledge and experience must be promoted to the fullest extent practicable in order to facilitate the solving of environmental problems taking particularly into account the needs of developing countries.

18. 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.

Response: 18. At the end of Principle #18, there should be added: "with the responsibility to compensate for such damage if it should be caused." Or, Principle #19 should clearly state that liability and compensation is a principle already established.

19. States shall co-operate to develop further the international law regarding liability and compensation in respect of damage which is caused by activities within their jurisdiction or control to the environment of areas beyond their jurisdiction.

Response: 19. See Advisory Committee Response #18.

20. Relevant information must be supplied by States on activities or developments within their jurisdiction or under their control whenever they believe, or have reason to believe, that such information is needed to avoid the risk or significant adverse effects on the environment in areas beyond their national jurisdiction.

Response: 20. Principle #20 should include a statement of the double obligation to give information and to take account of objections to proposed actions made on the basis of this information.¹¹

21. Man and his environment must be spared the serious effects of further testing or use in hostilities of weapons, particularly those of mass destruction.

Response: 21. Principle #21 should include: "Each nation causing environmental destruction, including the creation of additional human misery by the use of weapons, whether by itself or by a nation which has purchased them, should assume a responsibility to redress the resultant harm."

22. Co-operation through international agreements or otherwise is essential to prevent, eliminate or reduce and effectively control adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the interests of all States.

23. States shall ensure that international organizations play a co-ordinated, efficient and dynamic role for the protection and enhancement of the environment.

Response: The Draft is properly concerned with survival, but it should give more emphasis to the celebration of life and the opportunity for enhancing the environment. More attention needs to be given to the need and opportunity for public participation in environmental activity and decision-making.

Subcommittee 6

Institutional Arrangements

Mr. Thomas Malone—Chairman

Chairman, Committee on International Environmental Problems

National Academy of Science

National Academy of Engineering (Univ. of Conn. Graduate School)

Mr. Robert Anderson
Chairman of the Board
Atlantic Richfield Corp.

Governor James Carter
of Georgia

John W. Hanes
Vice Chairman of the Governor of
Virginia's Council on Environment

Mr. Denis Hayes
Environmental Action
Woodrow Wilson International
Center for Scholars

Subcommittee Director

Milner Ball

¹¹ See Chapter 2, Advisory Committee Recommendation 1B; Chapter 5, Advisory Committee Recommendation 1; Chapter 6, Advisory Committee Recommendation 6.

Appendix

List of Witnesses

The following is a list of witnesses who testified at the Advisory Committee hearings. Unfortunately, the publication deadline did not allow for inclusion of the names of those who requested that their written communication be part of the record. (The hearing city follows each person's name.)

Cleveland Amory (New York)

Robert Anderson (New York)
Chairman of the Board
Atlantic-Richfield Corp.
New York, New York.

Dr. William Aron (Miami)
Director, The Office of Ecology and
Environmental Conservation
National Oceanic and Atmospheric
Administration, U.S. Department of
Commerce

Dr. Stanley Auerbach (Washington)
President, Ecology Society of America
Howard Baker (New York)
United States Senator
Tennessee

Alice Barkley (San Francisco)
Architect

Dr. Christopher E. Barthel, Jr. (Chicago)
Director, Institute of Environmental
Science
Miami University

Theodore Berland (Chicago)
Executive Director
Citizens Against Noise

Alice May Berthelsen (Houston)
President, League of Women Voters
Houston

Dr. Perry Blackshear (Chicago)
Professor of Mechanical Engineering
University of Minnesota

Dr. Kenneth Boulding (Denver)
Professor of Economics
Program Director, Institute of Be-
havioral Sciences
University of Colorado

Mrs. Bremberg (Houston)
Governors Advisory Council
League of Women Voters
Houston

W. S. Bromley (Washington)
Forest Industries Council

Dave Brower (New York)
Friends of the Earth
(Former Director, Sierra Club)

Dr. Arthur Busch (Houston)
Environmental Protection Agency
Dallas, Texas

Prof. Lynton Keith Caldwell (New
York)
University of Indiana
Committee on International Environ-
mental Programs
National Academy of Sciences

Brant Calkin (Denver)
Director, Frontera Del Norte
Sante Fe, New Mexico

Mr. Charles H. Callison (Washington)
Executive Vice President
National Audubon Society

Dr. Henry K. Calvin (New York)
Executive Director
Committee on International Environmental Programs
National Academy of Sciences

Carl A. Carlozzi (Washington)
Associate Professor of Resource Planning
University of Massachusetts

John Case (Chicago)
Executive Treasurer
National Isaac Walton League

Jean Chamberlain (San Francisco)
Sierra Club

Dr. Leslie Chambers (Houston)
School of Public Health
University of Texas

Betty Chapman (Chicago)
Secretary, Sponsors for Science

Abram Chayes (New York)
Professor of Law
Harvard Law School

Barbara Clark (Chicago)
Assistant to the President
Minnesota Environmental Science Foundation

Cathy Clark (San Francisco)
Senior, Willard Glenn High School

Dr. Thomas Clingan (Miami)
Professor of Ocean Law
University of Miami

Mrs. Donald E. Clusen (Washington)
Director, League of Women Voters

Dr. Eugene V. Coan (Miami)
Office of Executive Director
Sierra Club

Barry Commoner (Washington)
Ecologist
University of Washington
St. Louis

Frank Compton (Denver)
President, Environmental Control Company

Dr. Ralph Conant (Houston)
Southwest Center for Urban Research

John S. Cooper (Washington)
United States Senator
Kentucky

Mariam Crawford (Denver)
Black Mesa Defense Fund
Sante Fe, New Mexico

Walter Cunningham (Houston)
Vice President, Century Development Corporation

Dr. Rezneat Darnell (Houston)
Prof. of Oceanography and Biology
Texas A & M University

Dr. Howard Daugherty (Washington)
Institute of Ecology

Dr. Dehlinger (Miami)
Director of the Marine Sciences Institution
University of Connecticut

Norman Dix (New York)
Senator Warren Magnuson's Staff

Prof. Doran (Houston)
Rice University

Ronald Eber (San Francisco)
Delegate to International Youth Center on Human Environment
McMasters University
Hamilton, Ontario

Bob Eckhardt (Houston)
U.S. Representative
Eighth District Texas

Edwin J. Eisenach (Denver)
Vice President, American Metal Climax

Robert Eisenbud (Washington)
Special Assistant
National Parks and Conservation Association

Samuel S. Epstein, M.D.
(Washington)
Case Western Reserve University
Cleveland, Ohio

Prof. Richard Falk (New York)
Woodrow Wilson School
Princeton University

Dr. William Fisher (Houston)
 Director of the Bureau of Economic
 Geology
 University of Texas
 Director of State Geological Survey

M. C. Ford (Houston)
 South Texas Section of
 The American Institute of Chemical
 Engineers

"The Fox" (Chicago)

Richard Frank (Washington)
 Attorney, Center of Law and Social
 Policy
 Representing the Sierra Club

Herbert M. Franklin (San Francisco)
 Executive Vice President, National
 Coalition

Skip Fulton (Houston)
 President, The Earth, I Care Club
 Memorial High School
 Houston

Richard Gardner (New York)
 Professor of Law
 International Union for Conservation
 of Nature and Natural Resources

Tom Garret (Washington)
 Wildlife Consultant
 Friends of the Earth

Dr. Gordon Goodman (Chicago)
 Head, Communaissance
 Downers Grove, Illinois

Dr. R. W. Goodwin (Washington)
 Chairman, Department of Biology
 Connecticut College

Rev. Gerard G. Grant, S.J. (Chicago)
 Chicago Chapter
 World Federalists

Doris Grundy (Houston)
 Program Director, Gulf Coast En-
 vironmental Education Project
 Earth Awareness Foundation

Arne E. Gubrud (Washington)
 American Petroleum Institute

Dr. Clair P. Guess (Miami)
 Executive Director
 Water Resources Commission of South
 Carolina

Dr. William Haggis (Miami)
 Director, Virginia Institute of Marine
 Sciences

Roger Hansen (Denver)
 Executive Director
 Rocky Mountain Center on Environ-
 ment
 Denver, Colorado

Dr. L. P. Haxby (Houston)
 Chairman, American Petroleum In-
 stitute's Commission on Oil Spills

Brad L. Hays (Denver)
 State Planning Officer
 State of New Mexico

Dr. William Hazeltine (Houston)
 Butte County Mosquito Abatement
 District
 California

Stanford Hershen (San Francisco)
 Architect
 Lecturer, University of California
 School of Design

Dr. Fred F. Herzog (Chicago)
 Dean, Chicago-Kent College of Law
 Illinois Institute of Technology

Lawrence Hinkle (San Francisco)
 Prof. of Medicine
 Director of Human Ecology
 Cornell University Medical Center,
 New York

James Hopper (Denver)
 Black Mesa Defense Fund
 Santa Fe, New Mexico

Rudolf Horowitz (Washington)
 New York Chapter
 Committee on the Natural Environ-
 ment
 American Institute of Architects

Patrick Horsbrugh (Chicago)
 President, Environic Foundation In-
 ternational

Warren Huff (Chicago)
 Partners of the Americas
 Washington, D.C.

Dr. Stephen Hunter (Denver)
 Graduate School of International
 Studies
 University of Denver

Clair H. Iverson (Denver)
Great Western Sugar Company
Denver, Colorado

John Jacobs (San Francisco)
San Francisco Planning Urban Re-
newal Association

Dr. David Jameson (Houston)
Associate Dean, Graduate School
University of Houston

Dr. Kenneth D. Johnson (Houston)
Assistant Technical Director
Air Quality and Occupational Health
The Manufacturing Association

Robert Johnston (Chicago)
Regional Vice President
United Auto Workers

Dr. Russell Jordan (Washington)
Vice President, Kettering Institute

Professor George Kennan (New
York)
Institute for Advanced Study

Dr. Kennedy (Houston)
University of Texas

Vivian KeVille (Washington)
Washington Field Representative
Fund for the Animals

Donald Keys (New York)
UN Representative, World Associa-
tion of World Federalists
Secretary, Conference on Human
Survival

Dr. F. Wayne King (Washington)
Curator of Herpetology
New York Zoological Society

Phil Knacker (Houston)
The Earth, I Care Club
Memorial High School
Houston

Frank J. Laird, Jr. (Denver)
Director of Environmental Engi-
neering
Anaconda Company
Tucson, Arizona

Edward L. Lantz (Denver)
Corporate Director, Environmental
Protection
International Minerals & Chemical
Corp.
Libertyville, Illinois

Mr. Laseroff (San Francisco)
Asian Foundation

Dr. Robert Lewis (San Francisco)
Prof. of Ecology and Human Medicine
Michigan University

Theodore Liebman (San Francisco)
Chief of Architecture
New York State Urban Development
Corporation

Benjamin Linsky (Chicago)
West Virginia University

Dr. Loring (San Francisco)
Science Adviser, Bureau of Commu-
nity Environmental Management
Department of Health, Education and
Welfare

John A. Love (Denver)
Governor of Colorado

Frithjof M. Lunde (New York)
American Institute of Architects

Dr. George Macesich (Chicago)
Director, Center for Slavic and East
European Studies
Florida State University

Warren G. Magnuson (Washington)
United States Senator
Washington (State)

Dr. Bassett Maguire (Houston)
Department of Zoology
University of Texas
Chairman, World Microcosm Project

Dr. William H. Matthews (Houston)
Dept. of Civil Engineering
Massachusetts Institute of Technology

Jack McCandless (Denver)
Gates Rubber Company
Denver, Colorado

Dr. Allen McGowan (Chicago)
Scientific Administrator
Center for the Biology of Natural
Systems
Washington University, St. Louis

Noel McInnis (Chicago)
Director, Center for Curriculum
Design
Evanston, Illinois

Dr. Herb McKee (Houston)
Chairman, Texas Air Pollution Control Board

Dr. Margaret Mead (Washington)
American Museum of Natural History

Allan Mendelsohn (Washington, Miami)

Glassie, Pewett, Beebe, Shanks
Washington, D.C.

Everett L. Millard (Chicago)
Editor, One World
Secretary, People First

Richard G. Miller (San Francisco)
Foresta Institute for Ocean and Mountain Studies
Carson City, Nevada

Dr. Richard Mock (Chicago)
Director, Division of Research
Saginaw Valley State College
Saginaw, Michigan

Dr. John Muench, Jr., (Washington)
Forest Industries Council

Reverend James Mulligan, Ph.D.
(Washington)
The America Institute for Biological Sciences

Mrs. Herbert Nadelhoffer (Chicago)
Constitutional Subcommittee of the DuPage
County Environmental Council

Dr. Ved Nanda (Denver)
Head, School of International Law
University of Denver

Gary Nelson (Chicago)
Chairman, Environmental Education Committee
Sierra Club

Rev. Richard Neuhaus (New York)
St. John's Church
Brooklyn, N.Y.
Associate Editor, Council on Religion and International Affairs

Dr. Nierenberg (Miami)
Director, Scripps Institution of Oceanography

Michael Noblett (Houston)
Candidate
Texas House of Representatives

Adam Norwall (San Francisco)
Former Chairman, United Bay Area Council of American Indian Affairs

Dr. Carl Oppenheimer (Houston)
Director, Marine Science Institute
University of Texas
U.S. Representative to the NATO Conference on Ecosystems

Bill Orme (Denver)
Student, Santa Fe, New Mexico

Ted Panaowski (Washington)
Director, Environmental Affairs
Izaak Walton League of America

Harry L. Parris, Jr. (Denver)
Executive Director, Regional Transport District
Denver, Colorado

Andrew Paulick (Washington)
Assistant Director of Conservation Department
International Union
United Auto Workers

Gunnar Peterson (Chicago)
Executive Director, Open Lands Project

Ambassador Christopher H. Phillips
(New York)
Deputy Representative
US Mission to the United Nations

Dr. George Pratt (Chicago)
President, Arkansas Polytechnic College

James M. Quigley (Houston)
Vice President for Environmental Quality

U.S. Plywood-Champion Papers Co., Inc.

Patricia Rambeck (New York)
Sierra Club

Lewis Regenstein (Washington)
Committee for Humane Legislation

Malcolm Rivkin (San Francisco)
Urban Planner

Dr. Walter O. Roberts (Houston)
National Center for Atmospheric Research

President, University Corp. for Atmospheric Research

Rich Rocchio (Denver)
Center for Research and Education
Denver, Colorado

Dean Rusk (New York)
Law School
University of Georgia

Wayne Schimpf (Chicago)
Director for Environmental Education
Open Lands Project

Herbert Schwartz (Miami)
Deputy Attorney General
State of Florida

William J. Scott (New York, Chicago)
Attorney General of Illinois
Chairman, Environmental Committee
National Association of Attorney
Generals

Frank Sebastian (Denver)
Senior Vice President
Envirotech Corp.

Paul Sedway (San Francisco)
Second Vice President
American Institute of Planners

R. Sethuraman (Chicago)
President, Chicago Chapter
National Audubon Society

Dr. Michael Shinkle (Chicago)
Nature Ways Association

Dr. Roger Shinn (New York)
Prof. of Religion
Union Theological Seminary
Columbia University

Prof. Louis Sohn (New York)
Chairman of the Commission to
Study Organization for Peace

Dr. Elvis Stahr (Washington)
President, National Audubon Society

Robert Stein (New York)
Woodrow Wilson Center for International Scholars

Nancy Stockholm (Chicago)
Chairman, Pollution Control Center
Oak Park-River Forest High School
Oak Park, Illinois

Dr. James Sullivan (New York)
Center for Science in the Public
Interest

Will Taylor (Houston)
Conservation Committee of the Regional Club
Sierra Club

William Towell (Washington)
Executive Vice President
American Forestry Association

Peter Van Gytenbeek (Denver)
Director, Trout Unlimited
Denver, Colorado

Jan Vander Zee (San Francisco)
Author

Paul Vylvisaker (San Francisco)
Professor of Urban Planning
Princeton University

Dr. Frederick T. Wall (Houston)
Executive Director, American Chemicals Society

Mrs. Russell E. Wallace (San Francisco)
International Relations Chairman
American Association of University
Women

Robert Wagner (Washington)
Director, Jackson Zoological Park
Jackson, Mississippi

Dr. Casey Westell (Houston)

Dr. Joachim Weyl (New York)
New York

Dr. Gilbert White (Denver)
Professor of Geography
Member, Institute of Behavioral
Sciences
University of Colorado

William L. C. Wheaton (San Francisco)

Dean, College of Environmental Design
University of California at Berkeley

Richard J. Wiechmann (Washington)
Forest Industries Council

John Wildenthal (Houston)
Vice Chairman, Gulf Coast Waste
Disposal Authority

John B. Williams (San Francisco)

Thomas Wilson (New York)
Vice President for Programs
International Institute for Environ-
mental Affairs

Morey Wolfson (Denver)
Director, Environmental Action of
Colorado

Robert Wood (San Francisco)
President, University of Massachu-
setts

Jack Ybarra (San Francisco)
President, Confederacion de la Raza
Unida

John Zapien (Denver)
North Denver Legal Services

Frederick T. Zeehandelaar (Washing-
ton)
Wild Animal Importer
New Rochelle, New York



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