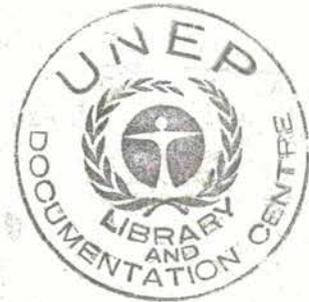


**THE RENE DUBOS CENTER
FOR HUMAN ENVIRONMENTS INC.
100 EAST 85TH ST., NEW YORK, NY 10028
(212) 249-7745**

Convened in May 1987
at the New York Academy of Medicine
to commemorate the 15th Anniversary of
The United Nations Conference on the Human Environment
held in Stockholm.



ONLY ONE EARTH FORUM

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In addition, we are indebted to countless people who contributed to the program's success but we will limit ourselves here to thanking those who made the forum possible:

Maurice F. Strong, forum chairman, who provided the overall guidance; **Robert A. Frosch**, forum co-chairman, whose leadership role on the steering committee and also as a workshop chairman contributed so much to its sum and substance, and **Gerard Piel**, forum rapporteur, who did a superb job of summarizing the results, both for the record and the special tribute held in the General Assembly of the United Nations.

We are grateful to the distinguished workshop chairmen -- **Edward S. Ayensu**; **Henrique B. Cavalcanti**; **Benjamin C. Dysart, III**; **Jorge E. Hardoy**; **William D. Ruckelshaus**; **Peter S. Thacher**; workshop rapporteurs: **Daniel G. Bates**; **C. Eric Carlson**; **Donald R. Lesh**; **Thomas F. Malone**; and resource persons who provided essential background papers.

Richard Barth, dinner chairman, **Hugh Downs**, master of ceremonies, and **William D. Ruckelshaus**, keynote speaker, contributed enormously to the Awards Dinner that launched the **Only One Earth Forum**. Outstanding contributions were made on behalf of the Dubos Center at the U. N. by Ambassador **Tom Vraalsen** of Norway, chairman of that session; **Mostafa Tolba** who presented UNEP's agenda for the future; and personal tributes to Rene Dubos by **Lewis Thomas** and **Jean-Paul Escande**.

James Power, a Williams College summer intern, and **Norma Borthwick** and **Stephen Winikoff** of our staff did an excellent job organizing and editing these proceedings.

William R. Eblen, President

Ruth A. Eblen, Executive Director

PREFACE

Maurice F. Strong

As we enter the global phase of human evolution it becomes obvious that each man has two countries, his own and the planet Earth. (Only One Earth - 1972)

It had been my great privilege as Secretary-General of the United Nations Conference on the Human Environment held in Stockholm in 1972, to introduce Rene Dubos and Barbara Ward and to enlist their cooperation in producing, with the support of some 100 other leaders from around the world, the book Only One Earth, which became the principal source of guidance and inspiration for that conference.

I was honored, therefore, to serve as Chairman of the distinguished committee of conveners for both Dubos Forum Programs that not only commemorated the 10th and 15th Anniversaries of that historic Conference but also celebrated the lives of Rene Dubos and Barbara Ward. Our objective was to assess the progress made since Stockholm with a view to developing action agendas for a more hopeful and positive future.

This report documents the proceedings of the second Only One Earth Forum (held at the New York Academy of Medicine 15-16 May 1987) and related activities that included:

* The Only One Earth Awards Dinner held at The New York Hilton that launched the Forum Program on 14 May 1987.

Richard Barth, President and Chief Executive Officer of CIBA-GEIGY Corporation, served as Dinner Chairman. The Master of Ceremonies was Hugh Downs and William Ruckelshaus provided the keynote speech. The Environmental Regeneration Awards were presented to:

Robert O. Anderson, in recognition of his extensive civic, educational and cultural contributions, especially as Founder and Chairman of the International Institute for Environment and Development (IIED); and

H.E. Mrs. Gro Harlem Brundtland, Prime Minister of Norway, for her contributions to the global community, especially as Chairman of the World Commission on Environment and Development (also known as the Brundtland Commission).

The Only One Earth Award was presented to Mostafa Kamal Tolba, Executive Director of the United Nations Environment Programme (UNEP), for his distinguished leadership in carrying out the goals and objectives of the Stockholm Conference.

* A Special Tribute was chaired by the Honorable Tom Eric Vraalsen, Ambassador of Norway, at the United Nations General Assembly Hall. This occasion provided the opportunity for the forum rapporteur, Gerard Piel, to summarize the results of the proceedings for an expanded audience. Lewis Thomas and Jean-Paul Escande provided commentaries on Rene Dubos, their late friend and colleague, and a special preview of "Only One Earth", a 12-part television series about the state of the World Environment produced by the Better World Society.

This Forum Program was the first major occasion in the United States in which an American and international group of professionals and public leaders examined in depth the themes, the recommendations, and the analysis of the report of the Brundtland Commission, prior to its being published as Our Common Future. The report guided the development of our agenda for this Forum in much the same way the Stockholm Conference developed the basic agenda for the world community around the theme of "Only One Earth" fifteen years ago.

"In human affairs, the willed future always prevails over the logical future" Rene Dubos said. "Throughout history and also prehistory we have had the freedom to choose our course, to change direction and even to retrace our steps in order to reach the goals we have selected."

"Willing the future" then is our goal. We hope that this meeting will help translate the report of the World Commission into realities in our economic life, in our political life, in the development of our culture, and in our educational systems.

ONLY ONE EARTH FORUM

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ONLY ONE EARTH FORUM

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- a) **Richard Barth** (Greetings)
- b) **Hugh Downs**
- c) **William R. Eblen**
- d) **Williams D. Ruckelshaus** (Keynote Address)

II. AWARD PRESENTATIONS

- a) **Robert O. Anderson**
Citation
Acknowledgement by **Robert O. Anderson**
- b) **Gro Harlem Brundtland**, Prime Minister (Norway)
Citation
Acknowledgement by **Jim MacNeill**
- c) **Mostafa K. Tolba**
Citation

III. PRE-FORUM ACTIVITIES

- a) **Selected World Reports**
- b) **Responses to Key Questions**
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- d) **Annotated Bibliography**
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THE DUBOS FORUM PROGRAM

Now that the environmental movement has come of age, the general public is becoming increasingly involved in all important decisions concerning environmental problems and technological developments. While such participatory democracy is desirable, it can be useless and even dangerous unless based on knowledge. (Rene Dubos - 1975)

Founded by the eminent scientist/humanist Rene Dubos, professor emeritus at The Rockefeller University, the Forum Program was established to help formulate policies for the resolution of environmental conflicts and for the creation of new environmental laws. The Center also maintains its library and archives bequeathed by Rene Dubos, supports educational research, provides a clearinghouse function, and develops media for both non-formal and formal education.

For over a decade, the Dubos Center has brought together authorities from many different vantage points, ranging from the technical to the humanistic, to develop creative solutions and to evaluate and disseminate the results. The following Forum Programs were organized and conducted to address specific aspects of environmental issues:

- 1987 **Only One Earth Forum**
- 1986 Managing Land Use
- 1985 Managing Water Resources
- 1984 Environment and Human Health: Toxic Chemicals
- 1983 Convocation for World Environmental Regeneration
- 1980 The Renaissance of A River
- 1979 Coexistence of Rural and Urban Areas
- 1978 Better Life Through Less Energy
- 1977 The Greening of Energy

For example, at the **Only One Earth Forum**, some 125 scientists, scholars, and leaders from government, industry, the media, and special interest groups, met in both plenary sessions and in five concurrent workshops on the following environmental issues: 1. Food, Land and Human Resource Development: Africa; 2. Managing Hazardous Substances; 3. Sustainable Agricultural Ecology; 4. Human Settlements: Factors Affecting the Quality of Life; 5. Managing Technology for Sustainable Development.

Dubos Forums are not technical, but rather, focused on costs, benefits and long-range consequences of environmental issues. The Center organizes and conducts its Forum Program with a view to acquiring and integrating the best available information for dissemination to the general public and policymakers.

FORUM SUMMARY

Gerard Piel

The Only One Earth Forum -- for which it is my privilege to serve as rapporteur -- was deeply informed and strongly impelled throughout its proceedings by the publication of the report of the World Commission on Environment and Development, Our Common Future. In our concluding plenary session today, we were summoned to the tasks that still lie ahead of us by the reading aloud of two paragraphs from the report -- you will find them on page 4 of the Oxford University Press edition of the report which we will have available in the bookstores of our country early next month. Let me read those paragraphs to you now:

"The planet is passing through a period of dramatic growth and fundamental change. Our human world of 5 billion must make room in a finite environment for another human world of 5 billion. The population could stabilize at between 8 billion and 14 billion sometime next century. More than 90 percent of that increase will occur in the poorest countries and 90 percent of that in their already desperate and bursting cities.

Economic activity has multiplied since 1950 to create a \$15 trillion world economy, and this could grow five- or tenfold in the coming half century. Industrial production over the past century has grown more than fiftyfold; over four-fifths of this growth since 1950. [That is to say, since 1950, the industrial output of the world has multiplied forty times. That was accompanied by a twenty-time multiplication of the consumption of fossil fuels. The projected growth of the world industrial system must now multiply that now vast number another twenty-five times.] Such figures reflect and presage profound impacts upon the biosphere as the world invests in houses, farms, transport, industries. Much of the economic growth pulls materials from the forests, the soils, the seas and the waterways."

We cannot shrink from -- we must embrace -- this prospect. The world must make that enormous economic growth. For the human population is fated, in the same finite period of time, to double or triple its numbers to a total of 10 to 15 billion. That economic growth must be accomplished if those new members of our species are to experience that minimum rate of improvement in average material comfort and security at which -- the demographic history of the rich nations has shown us -- the decline in birth rates can be expected to overtake the decline in death rates. At the intersection of those curves -- let us fix it on the calendar before the middle of the next century -- human population growth will begin to return again to the near-zero rate that prevailed (but at high birth rates and high death rates) before the industrial revolution began in the West.

The necessary economic growth cannot be attained, much less sustained, without equal concern for conservation of the finite environmental resources of our planet. Experience of the last fifty years has shown that much and many kinds of economic activity erode the world's resources. Economic activity in the in-

dustrial and the developing nations has already begun to modify the major cycles of the biosphere that turn over the carbon, the hydrogen, the oxygen, and the nitrogen of which living tissue is made, with consequences fifty years hence that are not now predictable. New technologies must supply the mainspring of economic development to come. They will entail still new risks on the local and the planetary scale, including prospectively new forms of life from biotechnology that could change evolutionary pathways. Ecology and economy in their interpenetrating interdependence have been fused in one single daunting whole.

This can be plainly seen in the hazard that is laid to the world environment by human poverty. In the developing world, whole life provinces have come under the peril of increasing numbers of landless people. To take but one example of global consequence, the tropical rainforests are being cleared at the rate of 11 million hectares a year; yet their fragile, underlying soils become agriculturally unproductive within a decade, and the farmers must move on, deeper into the forest.

Poverty in our time is not the product of lack of resources. Nor can it be laid to population growth. Poverty today is institutional; it is imposed and enforced by institutions, national and international. What populations of the poor countries have outgrown is their technology. The technology that can secure the livings of their people from their indigenous resources belongs to others. That technology, though it is the common heritage of mankind, is inequitably possessed by the one-fourth of humankind that lives in the industrial countries. Inequity, no less institutional, prevailing within the poor countries deepens the poverty of the poorest.

The institutional relations between the poor and the rich place the poor under compulsion to despoil their environmental resource base. Debts they cannot pay compel them to use their resources not for development but for export to their creditors on unfavorable trading terms. Thus poverty in the developing countries, enforced by economic inequality between the developing and the industrialized world presents at once the planet's main environmental problem and its main economic problem.

The resolution of that problem, the cure of poverty by sustainable economic development becomes an urgent objective for the rich as well as the poor nations of the world. The agencies, national and international, governmental and private, confronted by this challenge, were all established on the basis of compartmentalized goals and concerns. Industries and industrial ministries, for example, are preoccupied with production and production targets; they leave the accompanying pollution to be cleaned up by somebody else. The same limitations in mandate and horizon hobble the performance of international agencies concerned with development, with lending, with trade regulation, agricultural development, and so on. The hope to choose policy paths that are sustainable requires that ecological dimensions of policy be considered at the same time as the economic, trade, energy, agricultural, industrial, and other dimensions on the same agendas and in the same national and international institutions. This is the chief institutional challenge of the 1990s.

This was the agenda set by the World Commission on Environment and Development addressed by Our Only One Earth Forum. We did our work in five

concurrent workshops. I cannot now give you a full account of the deliberations of each workshop. I can tell you that they found running through all of their discussions a number of significant and compelling themes.

The first is the rising importance in world affairs of what U.N. parlance calls nongovernmental organizations. It was the NGOs in the industrialized and in the industrializing nations that brought the convening of the Stockholm Conference.

Again and again, the panels made the same discovery: the intractable problems that confront mankind were being solved at the local and community level by people exercising their own wits and intelligence and acting with self-reliance. We who are concerned can count upon our fellow men to meet their problems; they can solve them sooner if just a modicum of equity is extended to them; if, above all, access to modern technology is opened to them.

Again and again, each of the panels encountered the need to release and empower the internal incentives of people and the energy those incentives supply to human enterprise in place of the external dictates and pressures that have accompanied the aid and assistance extended to them over the past forty years.

In short, the record, as reviewed in each of the workshops, shows that human individuals can make a difference, just as the life of Rene Dubos, that is also celebrated here today, shows us how one man can make a difference.

I want to report first on the workshop concerned with the management of hazardous substances. This is, in particular, a problem of the developed and industrial world. But it is one that becomes a problem of all mankind as the benefits of industrialization reach the poor countries of the world. In hazardous waste management, we have seen over and over again how nongovernmental institutions, the citizens and the communities who are exposed to the hazards, have acted to frame the issues, to compel action by government and by industry to clean up hazards laid inadvertently and unexpectedly and through insufficiently wise and forethoughtful action. It is above all the individual initiative expressed through community organizations, through environmental organizations, through scientific societies that have, as I said, framed the issues, compelled the assessment of the hazards and brought the establishment of appropriate legislation and governmental agencies to bring these hazards under control.

Of immense importance in the management of hazardous wastes is public understanding of the nature of these hazards. The failure of that understanding is nowhere more strongly expressed than in the collapse of the nuclear power industry. But the collapse of the nuclear power industry itself reflects a failure on the part of industry and government in the launching of that industry. Following what one member of our deliberation called "the path of least expenditure," government and industry, in both the market economies and the socialist economies, installed in their domestic power systems the nuclear reactors they had first designed for their submarines and aircraft carriers.

Nuclear technology can build and operate failsafe reactors that cannot go into meltdown. The management of the wastes that they produce is a much more finite problem than the billions of cubic kilometers of noxious gases that are

emitted by the burning of fossil fuels and which now threaten the climate and the sea level of our planet. That is one of the hazards of fifty years hence to which decisions taken today are exposing us.

The economic development necessary to secure a stable world population in the next fifty years will require five times the present output of energy. It is apparent that other primary sources of energy -- not fossil fuels -- must supply it. The primary source nearest at hand is the nucleus. But the consensus is that it cannot be harnessed until its problems have been addressed and it certainly cannot be installed until a well-informed public understands how the problems that it presents are able to be managed.

Our next panel, in reasonable order of priority, was concerned with the attainment of sustainable agricultural ecology. Here, again, it was individual initiative at the local level, innovation working up from below rather than being imposed from above, that brought increase in agricultural productivity and along with it the protection of the environment.

One such innovation was represented by a member of that workshop, Professor Daniel H. Janzen of the University of Pennsylvania. He has set out to double the extent of the dry tropical forest of the west coast of meso-America. Such forest -- to be distinguished from the rain forest -- covers most of the tropics. In meso-America it was once the size of France; today it covers a few hectares. Singlehanded, Professor Janzen is demonstrating that this forest can be restored.

Charles A. Howell III, a member of that panel supplied this credo for the management of sustainable agricultural ecology:

"We believe that conservation is simply a minimization of waste of natural resources and maximization of future resource options. It follows that in order to maintain, rehabilitate, and promote sustainable systems for the provision of food, fiber, and habitat for all the creatures of this only one earth in perpetuity, all persons and all institutions must seek to eliminate alienation from the land caused by environmentally impoverished urban settings, by environmental degradation, by destruction of habitat, by extinction of species, or by failure to recognize the intrinsic value of the land, rather than viewing the earth's ecosystem as an inexhaustible source of commodities."

Our next workshop was concerned with the life of those towns in the developing countries of the world, which somehow or other must contain 90 percent of the doubling or tripling of the world's population by the next mid-century. At the end of this century, eighteen of the twenty cities of more than ten million population in the world will be cities of the underdeveloped countries. Here, poverty finds its most disheartening expression.

At the same time the people of these cities present us with examples of the self reliance and the rationality not ordinarily credited to the wretched of our Earth. The shanty cities, the squatter towns, they have built around the great formally established capitals and metropolises of the poor countries of the world now contain more than half the urban population of those countries. They have supplied their own building materials, have invented their own modes of housing, have

managed to create stable communities, even though their occupation of the land they build on is illegal, their dwellings are illegal, and the existence of their communities is not recognized by their governments.

These communities conduct, it is estimated, more than half of the total economic activity of the new nations of Africa, and at least half of the economic activity of the nations of Latin America. These people are responsible for the planning and construction of most of the new houses in the world. In doing so, they contribute to most of the capital formation of these countries. They create employment through their demand for materials, fixtures, and fittings. They mutually generate activity that makes the service sectors the fastest growing part of the economy of the poor nations that have yet to go through their industrial revolutions.

With the right kind of support and advice from outside and with careful redesign of their institutional relationships to the larger society around them, these communities can become the source of human enterprise and initiative to solve the problems of poverty.

In discussion of their problems the workshop was impressed with the possibilities for helping them that lies in the blocked funds of multinational corporations doing business in those countries and in the enormous debt that hangs over the countries of the Third World. This possibility became a concern of our fifth panel and I shall return to it.

Our fourth panel addressed the problems of sub-Saharan Africa as a concrete example of the rural and urban life of the world of the poor. Edward Ayensu, chairman of that workshop, declared that the fifteen years since Stockholm have seen the leadership of the new countries of Africa stressed and stretched and, in some cases, put in panic by the ecological disaster that has overtaken them.

Again, it was the informal economies of those countries, the individuals who find solutions to their own problems, that give us hope. This panel made two important findings: Human resource development cannot be separated from issues of ecological rehabilitation; a key step to the liberation of human capacity to accomplish both objectives is land reform. Second, women are responsible for 60 to 90 percent of the food production, processing and marketing in Africa. No one can address the food problem or any of the other problems in Africa without addressing the question of women, and accepting women as participants in decision-making processes at all levels.

Our last workshop concerned the institutional dimension. That workshop found merit in the possibility that the debt owing to the rich from the poor might be "re-cycled." It can be kept there in place in the poor countries as capital for the financing of economic development. An historic precedent and a model is presented by the use of U.S. Public Law 480 funds. These funds hypothecated the "loan" of wheat and other emergency food supplies in the late '50s and early '60s; they financed the supply of better-nourished manpower, especially in India, to massive infrastructure enterprises.

That workshop also strongly affirmed the findings of the first four panels that the nongovernmental institutions -- so many of them represented by you who are present here today -- have a crucial role to play in meeting the challenge that daunts us all. The challenge is to make the Earth our home at last. By the middle of the next century, our species must stabilize its numbers at a total that can be supported in material comfort and security by sustainable cultivation of the natural environment. The urgency of that objective is set by the realization that we have only 4613 days to the end of this century. By that time the world will have added a population equal to that of the world in 1900.

Our species has become a geological force, acting on a global scale at a velocity that races ahead of ordinary geological processes, to be compared only with volcanic eruptions and cometary impacts. The task of bringing human life into adjustment with its environment on the only planet it will ever know, within this next century, is one that asks for the commitment of everyone: rich and poor.

SUMMARY

WORKSHOP I

FOOD, LAND AND HUMAN RESOURCE DEVELOPMENT: AFRICA

*The most valuable achievement of the megaconferences of the 1970s was probably to reveal that the best and commonly the only possible way to deal with global problems is not through a global approach but through the search for techniques best suited to the natural, social and economic conditions peculiar to each locality. -
-Rene Dubos*

Chairman:

Edward S. Ayensu
President
Edward S. Ayensu Associates, Ltd.
Washington, D.C.

Rapporteur:

Daniel G. Bates
Chairman and Professor of Anthropology
Hunter College
New York City

Since the 1972 Stockholm Conference, the countries of Africa have continued to experience a wide range of environmental problems and have developed a correspondingly wide range of short and long-term solutions. In one important respect, given the challenges faced and crises survived, the African experience is one of success: despite great hardships the people and nations of Africa are not only surviving but adapting in innovative ways. The following recommendations are intended to build on what has been learned and accomplished to date.

The post-independence experience of most African countries might be viewed in terms of three interrelated transformational processes.

1. Political and redistributive centralization, as manifested in such phenomena as:
 - (a) increased urbanization and the growth of national and regional centers;
 - (b) growth in scope and influence of national administrative or regulatory agencies, consequently, highly centralized decision-making, unresponsive to local concerns;

- (c) Expansion of media and educational systems under centralized control and direction, giving a "top-down" bias to flow of information.

2. Economic intensification, as manifested in:

- (a) the increase in the importance of the formal sector and monetarization of the economy;
- (b) the increase in specialized use of land, including use of land for non- food export crops;
- (c) heavy reliance of farmers on one or two cash crops or "anchor crops;"
- (d) field consolidation in medium and high potential areas and the extension of intensive or highly specialized agriculture into ecologically "risky" zones;
- (e) involvement of many rural households in wage labor, including migratory labor.

3. Social and economic differentiation, as manifested in:

- (a) marked distinctions in urban and rural housing and life styles;
- (b) increasing rural-urban contrasts in recreational activities and social services used;
- (c) rural poverty in areas of high agricultural productivity due to differential access to land, capital and labor resources;
- (d) increasingly marked interregional differences in living standards, amplified by agricultural intensification in high potential areas;
- (e) growing rural unemployment as labor becomes less important relative to technology and capital resources;
- (f) division of labor by sex and age increasingly reflects economic differentiation with women and children of wealthier families removed from farm labor.

The point to be kept in mind is that the costs of these and other social, political and economic transformations should be considered along with the benefits. While agricultural intensification is essential for meeting the food demands of a growing population, sustainable agricultural development requires that the limits to growth as well as potentially negative long-term concomitants be considered. Similarly, while not all aspects of social differentiation have negative implications for long-term environmental stability, they do raise concerns about social and economic inequities.

Recommendations for the Future:

1. Environmental concerns should be incorporated in every project of planned change from the very onset of discussion and the establishment of objectives.
2. There should be greater recognition that the success or failure of any project will rest on local population input in planning and implementation. Hence, to better assess the social impact of policies, social scientists should be drawn into the development process at the onset of the planning process, and to a far greater extent than they have been previously.
3. Successful economic and environmental planning must proceed from an awareness of and respect for indigenous solutions, traditional knowledge and expertise. More attention should therefore be paid to the study of indigenous systems of land use, environmental knowledge and techniques of resource exploitation.
4. African educational systems should place more of an emphasis on environmental concerns and should stress, in particular, the value of indigenous or traditional knowledge and values as they pertain to natural resources.
5. A substantial effort should be made to train local workers in or near their places of residence with an emphasis on their contributing to (rather than replacing) indigenous cultural systems.
6. Inasmuch as agricultural productivity has to be increased each year to keep up with food demand, research in this area is critical. There is an urgent need to establish the capacity for soils research throughout the continent. Agricultural extension training centers should be further equipped and staffed and new ones opened. Further research is needed on the following:
 - (a) smallholder farming systems and the social organization of farming communities;

- (b) the properties and characteristics of indigenous materials, flora and fauna, as well as local ways of utilizing them, because the key to a sound agricultural environment is the maintenance of diversity, in both the animal and plant kingdoms;
 - (c) food storage and transport because far too much food is lost each year due to waste in storage and on-farm storage systems, including traditional ones, should therefore be emphasized.
7. In conjunction with agricultural research, there should be a focus on equitable distribution of resources.
 8. Governments should be encouraged to stress an environmentally and socially appropriate mix of food and cash crops. A sensible balance will entail a substantial "safety net" of locally available food stocks. Governments should remove policy disincentives to ecologically sound but innovative farming.
 9. Donor countries and institutions should return to an earlier policy of supporting "institution building." For example, there is an urgent need for the establishment of educational and research facilities, including universities, agricultural research institutions and agricultural training centers.
 10. International agencies should assist in establishing a "hard currency" Food Reserve Fund to come into play during times of food shortages.
 11. Governments should be encouraged to establish realistic social security systems, particularly for civil servants, to ensure the growth of an effective and honest bureaucracy.
 12. African and non-African governments should work to encourage trans- African trade, particularly in food.
 13. Continued high rates of population growth indicate that more research is needed in the area of family organization as a basis for further family planning initiatives. More research on sex roles and patterns of household labor deployment are required. Even fairly modest efforts in the education of women have significant consequences in reducing fertility and improving child health. Such programs should be expanded.

14. Governments should place more reliance on the "informal sector;" indeed, the main reason for the success of some projects is the ability of individuals to work out "informal" solutions. Cooperating groups and networks of family, kin and neighbors are responsible for a substantial percentage of rural and urban housing construction, land clearing, herding and harvesting. Informal systems of marketing, pooling labor, capital and other resources should be encouraged or, at least, tolerated.
15. Further research, both technical and behavioral, is needed in the area of sanitation and water quality. Water-borne diseases are a major factor adversely affecting the quality of life and the health status of most rural dwellers.
16. African governments should encourage local and foreign researchers to conduct urgent medical, epidemiological and behavioral research on issues relating to the AIDS epidemic.

SUMMARY

WORKSHOP II

MANAGING HAZARDOUS SUBSTANCES

Modern technology has clearly improved the quality of our lives in countless ways, but it has inevitably generated new risks fundamentally different in both character and magnitude from those encountered in the past. Much effort has gone into calculations and estimates of various risks, but too little effort has been devoted to the question of acceptability of risk for the sake of socio-economic values. --Rene Dubos

Chairmen:

Henrique B. Cavalcanti
Director
International Environmental Bureau
Switzerland

William D. Ruckelshaus
Perkins, Coie
Seattle, Washington

Rapporteur:

Robert SanGeorge
Vice President, Public Affairs
National Audubon Society
New York City

Two issues were focused on that are related in some respects: nuclear power and the handling of hazardous substances.

It was agreed that if nuclear power was to have a significant role in the future of energy generation, specific problems would have to be successfully addressed.

1. Increase public understanding of the potential for new technologies to eliminate the possibility of a cataclysmic failure -- one of the biggest public concerns associated with nuclear power. These new technologies provide not only for much smaller plants but also significant potential for minimizing the waste problem.
2. Establish a siting process that is inclusive in terms of involving the public and not limited geographically. There is a

need not only for locating more remote areas which have adequate infrastructures but also for sharing much more information relating to problems associated with nuclear power.

3. Make sure that personnel are technically trained prior to managing nuclear power plants wherever and whenever they are located.
4. Separate civilian uses of nuclear energy from military and ensure that separation for the future through international agreements.

In order to move to the problems of hazardous waste, the objective was first defined as: addressing the problems about the management, production, transportation, use and ultimate disposal of substances that may cause harm to man or the environment.

The issue was looked at from the standpoint of public participation and risk communication. It was suggested that a successful public participation process would empower the public towards actual participation in the implementation of decisions (e.g. public monitoring of stations around a particular plant to enforce regulatory standards).

Risk communication is a piece of the public participation process and it involves an understanding of public demands and concerns by government, industry, and the scientific community, as well as communication from these various sectors to the general public. The public should have a clear understanding of the risks to which they are exposed. The data and assumptions provided by the scientific community should be summarized in language that is easily understood by the general public.

Possibilities for action regarding the management of hazardous waste were discussed in three areas: government, industry, and non-governmental organizations.

1. Role of Government

- (a) Ensure that there are systems in place to protect the public and ecosystems from harm caused by exposure to toxic substances in the developing as well as the developed countries.
- (b) Develop a "systems approach" to regulating the movement of hazardous substances (e.g., understanding how pollutants discharged to one part of the environment cause damage in some other part, and identifying solutions which would minimize overall risk to humans and to the environment).

- (c) Emphasize research on areas relating to risk assessment and risk management.
- (d) Encourage developed countries to take some responsibility to do research that would assist the less developed countries.

2. Role of Industry

- (a) Anticipate the need for certain health, safety, and environmental standards, new legislation, and community involvement when an industry is located in a developing country.
- (b) Adopt an ethic inside the corporation itself associated with protecting the environment, public health, employees, the surrounding community and any other stakeholders in the enterprise.

3. Role of nongovernmental organizations

- (a) Assume the important watchdog role.
- (b) Serve also as an arbitrator and repository of information.
- (c) Educate not just their own members but the general public as well.

There was a strong consensus about the need for much more research. The amount of money that is being spent to try to do something about the problems of hazardous substances is far exceeded by the amount of damage being done to public health and the environment by these substances. There is simply an urgent need for societies to put more resources into understanding the nature of the problems, evaluating what we are now doing to solve them, and moving forward with additional options for addressing them. For example, some questions to be addressed at future forums:

1. What strategies could be used to successfully involve the general public in the decision-making process?
2. What kinds of incentives, disincentives, and regulatory activities could be undertaken to make more progress in dealing with hazardous substances?
3. What cross-national approaches to risk management have, and have not, worked?

Finally, it was emphasized that instead of the constant confrontation that underscores so much interaction in the area of managing hazardous substances, international cooperation across all sectors must be encouraged.

SUMMARY
WORKSHOP III

SUSTAINABLE AGRICULTURAL ECOLOGY

*...Interrelationships between living things and their environment... are always influenced by the human presence, which introduces an ethical component into all environmental problems. Since the nature of our activities determines the extent and direction of environmental changes, ecological thinking must be supplemented by humanistic value judgments concerning the effect of our choices and actions on the quality of the relationship between humankind and Earth, in the future as well as in the present. --
Rene Dubos*

Chairman:

Benjamin C. Dysart III
Past President and Chairman of the Board
National Wildlife Federation
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Rapporteur:

Donald R. Lesh
Executive Director
Global Tomorrow Coalition
Washington, D.C.

A broad spectrum of humanistic value judgments -- with perspectives ranging from West Tennessee to East Africa, and from the Arctic to the tropics -- was applied to the critical issues of sustainable agricultural ecology.

The approach taken, by consensus, was very broad, viewing sustainable agriculture as a subset --albeit an extremely important and complex subset -- of the conservation ethic worldwide. Even the definition of "agriculture" was construed broadly as

the process of providing natural foods, fibers, materials,
and pharmaceuticals to meet human needs and
demands.

That definition made possible the inclusion not only of issues related to the conventional concept of farming, but animals in traditional societies for commercial uses and to meet individual needs for food, clothing, and materials.

In response to the challenge that not only opinions and comments but concrete suggestions, proposals, or programs for action must be produced, discussions were structured in three major areas.

1. Philosophy and Ethics (VISIONS)

Conservation is simply a minimization of waste of natural resources and a maximization of future resource options. Therefore, in order to maintain, rehabilitate, and promote sustainable systems for the provision of food, fiber, and habitat for all creatures of this "only one earth" in perpetuity, all individuals and institutions must seek to eliminate alienation from the land caused by: (a) environmentally impoverished urban settings, (b) environmental degradation, (c) destruction of habitat, (d) extinction of species, or (e) failure to recognize the intrinsic value of the land, viewing the earth's ecosystems only as an inexhaustible source of commodities.

2. Issues and Questions (POLICIES)

(a) Human and cultural degradation

As a consequence of extreme poverty, people are forced to plant crops on poor soil, graze their stock on marginal land that in time desertifies, and cut trees needed to stabilize soils and water supplies. Under the influence of expanding global economies, many cultures have been compelled to abandon past practices, with a concomitant diminishing of sustainable use of land and food resources.

(b) Respect for traditional practices

Fauna, fowl and fish, lands, wetlands, rivers, already being managed in various ways should be subjected to new conservation measures only in collaboration with those living on the land, and with respect for the traditional management practices already developed by them.

(c) Harvests of wildlife

Traditions of food procurement directly from surrounding wild vegetation and wildlife on a sustainable-yield basis is being threatened by: (1) habitat destruction, (2) unfairly restrictive legislation, (3) erosion of traditional conservation practices, and (4) destruction of markets for the products of these groups.

Lack of adequate replacement for these foods

frequently results in malnutrition and associated health problems.

Development projects and legislation should be planned and implemented in consultation with local people in a way that will not adversely affect their opportunities for the procurement of food.

- (d) Military installations should avoid: (1) exclusion of civilian population from use of traditional lands, and (2) destruction of critically important ecosystems.

- (e) Foreign aid and international debt

Assets which would otherwise be used to reduce debts should be redeployed in investments in specific projects for agricultural and environmental regeneration. Foreign aid should be targeted and scaled down to levels appropriate to local needs.

- (f) Levels of technological input

As a guideline, the lowest possible systems cost and the lowest possible level of technological input are more likely to result in sustainable food production over the long term than a high- input, high-technology approach oriented toward quick results.

- (g) Biotechnology

Genetic engineering could produce an unlimited number of new varieties of plants tailored to flourish under a broad array of sustained- yield agricultural conditions. The means for development of new varieties should be subject to control if: (1) the modified species can survive independently of human control, (2) the new species may replace the parent species, or (3) the means employed to obtain the desired characteristics could move beyond the area of proposed application.

- (h) Regenerative Approaches

Ensure that each crop planted and harvested improves the soil, water, or other growing environment in which it was produced. Regeneration should be the preferred approach to sustaining and improving any system over time.

(i) Driving forces (incentives)

Identify and provide incentives to choosing sustainable yield agriculture. All participants should share in planning and evaluating programs so that internal motivations replace passive acquiescence to externally imposed programs.

(j) Urbanization

Urbanization results in new patterns of trade and transport, creating a complicated infrastructure focused on service to metropolitan areas rather than on sustaining agriculture or regenerating the environment.

(k) Prioritization

The process of setting priorities should involve the broadest possible local participation.

3. Institutions and Strategies (ACTIONS)

- (a) Ensure the direct participation of citizens in the design and development of their communities, and in the basic systems that govern their lives.
- (b) Establish institutions and mechanisms to encourage the interchange of appropriate technologies and traditional practices.
- (c) Plan agricultural systems to ensure that food production is first applied to meeting local consumption needs. Commodity production for export to help balance a nation's debts must not be permitted to outweigh the requirement to meet internal demand. World Bank and other foreign assistance projects should carefully acknowledge this priority.
- (d) Implement fiscal programs that are consistent with the goal of sustainable agricultural production and incorporate clear incentives for citizen participation and support.
- (e) Integrate environmental values and the conservation ethic into all forms of education and all educational institutions.

SUMMARY

WORKSHOP IV

HUMAN SETTLEMENTS: FACTORS AFFECTING THE QUALITY OF LIFE

The recommendations of the Vancouver Habitat Conference were explicit with regard to the fact that all people need clean water and decent shelters. The techniques required to meet these obvious biological necessities, however, must be designed to fit local conditions such as the density of the human settlements, the topographical, geographical and climatic conditions, and of course the economic resources. The design of shelters is further complicated by local social habits and tastes. The recommendations concerning cultural matters or quality of life had to be even less specific because these values have intense local and historical characteristics that transcend scientific determinism and definitions. -- Rene Dubos

Chairman:

Jorge E. Hardoy
Director, Latin American Office
International Institute for
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Argentina

Rapporteur:

C. Eric Carlson
Special Adviser
International Union of Building
Societies and Savings Associations
New York

There has been marked deterioration of the human settlements situation since the Stockholm Conference of 1972 and the Habitat Conference held in Vancouver in 1976. Half of the world's population -- now totalling 5 billion -- will be living in urban areas by the year 2000, primarily in cities of the Third World.

The appalling realities of the existing urban scene were reviewed: the growing numbers of homeless in both developed and developing countries; the millions of street children; deplorable health conditions and disease rates; the lack of adequate schools, hospitals, public services and facilities; and the general overcrowding and congested networks of communication and transportation. Meaningful efforts need to be made at the international level to do something about integrated Habitat improvement. A sense of direction for national and international programs in this field is still needed. While these conditions are accelerating, financial resources for investment and action from the world community are diminishing.

Some answers to four key questions were provided.

1. What can the State do to enhance living conditions and opportunities for large masses of people?
 - (a) Ensure proper land management by: (1) reviewing existing legislation on land use and tenure, and (2) improving land market processes.
 - (b) Promote self-help construction by providing incentives, insurance and guarantees.
 - (c) Strengthen the community's identity by: (1) highlighting the role of local government as implementor, (2) revising building codes and standards, (3) making small grants or loans for improvement through credit unions, and (4) encouraging the growth of community organizations.
 - (d) Remove legal and other impediments to the growth of informal-sector activities in which the majority of urban poor earn their livelihood -- in many cases in their own homes.
2. Why is government performance so poor in relation to the construction and management of cities?
 - (a) Enormity of problem -- requires cooperation between various sectors (formal, informal, private, self-help) involved in housing and social development.
 - (b) Centralization of power -- inability to confront problems using a non-vertical approach.
 - (c) Norms and standards for building, planning and infrastructure arbitrarily imposed -- instead of being carefully tailored and adapted to the situation in each regional setting.
 - (d) Investment capacity lacking -- to make any impression on the huge backlog of needs for infrastructure and services as well as resources to maintain the facilities.
 - (e) Corruption -- safeguards needed to minimize opportunities for illegal conduct.
3. How can we develop the capacity to think and work in teams with a different vision of the world?

- (a) Direct funds through a concept of community-based organizations to multiply and maximize basic improvements in human settlements for large sectors of the population.
 - (b) Establish special instrumentalities to promote and accelerate institution-building processes, e.g.: (1) Foundation for Community Development and Municipal Improvement (FUNDACOMUN) in Venezuela, (2) Foundation for Low Cost Housing (FONHAPO) in Mexico, and (3) China's national organization for housing and urban development.
 - (c) Provide local communities and governments with access to state of the art technology in information systems, management techniques, and property taxation systems.
 - (d) Mobilize a network of cadres, trainers and animators at the community level to implement projects and to work with local government officials in their application of technical skills and management for community development.
4. How can new opportunities be opened up for the people who are the true builders of large parts of Third World cities so that they can become officially involved in the construction and management of those cities?
- (a) Seek ways to remove the various legal, economic and political obstacles they face.
 - (b) Provide them with the necessary legal, economic and physical resources and support.
 - (c) Secure their effective integrated participation in policymaking.
 - (d) Guarantee women's insights, resources, and participation as part of all levels of planning, organization, building and management.
 - (e) Establish new and creative local government management training programs.
 - (f) Strengthen and support appropriate existing programs.

- (g) Emphasize local skills, technology and ability at all levels, but particularly the "hands-on" knowledge of local communities.
- (h) Facilitate decentralization of government so that local governments have taxing authority and an adequate tax base.

SUMMARY

WORKSHOP V

MANAGING TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

Our societies are slowly becoming aware of the environmental problems created by the social mismanagement of technology and may succeed in developing techniques for controlling some of them. However, while the kind of piecemeal social engineering that environmentalists are now developing will be useful, it will not go far toward solving the ecological crisis or its attendant threats to the quality of human life. The technological fix amounts to little more than putting a finger in the dike, whereas what modern societies need is a coherent philosophy of man in his environment. --Rene Dubos

Chairmen:

Robert A. Frosch

Vice President, Research Laboratories
General Motors Corporation
Michigan

Peter S. Thacher

Distinguished Fellow
World Resources Institute
Washington, D.C.

Rapporteur:

Thomas F. Malone

Scholar in Residence
St. Joseph College
Connecticut

Since there were no illusions about yielding a definitive action plan, the accepted objective was more modest: to put in place one more step in a continuing effort to generate the political will to take those measures essential to ensuring our common future. Questions of institutional arrangements were divided into three subjects labelled vision, process, and institutions.

With vision, the hope was to get some idea about what the ideal state would be and also some idea and way of assessing, sorting out and prioritizing the problems that have to be dealt with so that they can be attacked. As stated in the report of the World Commission, UNEP has an extremely important role, both through Earthwatch and similar processes and as a leader in the assessment of risks for environment: both of these coupled with the sustained development problem.

By process, reference was made to the means that have been used successfully in working on global problems today. Particularly, process is one in which problems have been raised and a variety of institutions and institutional mechanisms have been brought together -- intergovernmental mechanisms, governmental mechanisms, nongovernmental institutions, including industry, private organizations, NGOs and individuals -- in a process of discussion and assessment of the problems. This should lead to:

1. some kind of agreement about what sorts of activities might be undertaken to solve these problems;
2. agreements to take action, which may be formal international agreements or informal agreements among industry and other parties; and
3. action which helps to solve the problem; the evolving work on the ozone and chlorofluorocarbon problems is a good example of this kind of process.

Finally, there is a management phase (institutions) in which one works on the process, and then a later assessment phase in which one decides whether real progress has been made or whether other things have to be done. Looking at this defined interactive process, it was noted that it needs leadership.

In this connection, UNEP has a special leadership role with regard to helping the development-responsible institutions to internalize the environmental consequences of development into their work so that environmental consequences and development go together. This is part of the meaning of the sustainability of development: the fact that it deals with the overall environment in such a way that long-range, not just short-range, solutions may be found.

Further, government organizations need to take action so that the local groups, especially in developing countries, can be empowered by means of a flow of information and knowledge to play an appropriate role in solving environmental, developmental problems in those countries.

The workshop sees very large and expanding roles for nongovernmental institutions, including industry, civil groups of various kinds, and individuals. An increase in the number and a strengthening of nongovernmental institutions of all types are needed to make the desired feedback and consensus-building process work. Real participation and ownership of the process and the solutions can thereby be obtained.

It was noted that the media and the educational systems have a vital role as transmitters of information and as transmitters of the visions that need to be constructed. They are essential in developing the capacity of individuals to support, influence and participate in this process of identifying and finding solutions to these problems.

There is also a need to use the process more generally than in just the environmental and sustained development fields. The whole question of the deployment and redeployment of intellectual and economic resources needs to be worked on in order to solve these environmental and sustained development problems and, in particular, to look for ways of redirecting the debt problem. Our world needs to view debts as money or potential money in places where it can be made useful.

FORUM OVERVIEW

Maurice F. Strong

The meetings that we have are not going to produce a ringing declaration or a universal document. The final reports of the meetings will be done by men to whom that responsibility can be very safely entrusted, so we won't waste your time by trying to produce an agreed upon consensus report. We hope that you will be as vigorous and as outspoken and as specific as you can be in trying to insure that your ideas are developed through interchange with your colleagues and processed to the point where we can present them to the world through our report. Of course, each of you will be a very important channel through which the results of this forum become effective in the real world.

I am very impressed with the range of experience that is represented here this morning. I am particularly delighted with the quality of our workshop chairmen. I'm delighted, too, to see in this audience so many of those who made the Stockholm conference, for which we celebrate the fifteenth anniversary this year, such a landmark event. In fact, it is really rather nostalgic for me to look in this audience and see those who were my co-workers at Stockholm and to whom the credit for whatever success the Stockholm conference enjoys really belongs.

The absolutely central role of the Only One Earth report by our late friends, Rene Dubos and Barbara Ward, has already been made quite evident. They were an absolutely unbeatable team; their messages have inspired the Stockholm conference and they continue to enlighten and inspire us today.

Just as the Stockholm conference fifteen years ago developed the basic agenda for the world community around the theme of "only one earth," the World Commission's report just released has guided the development of our agenda here. This is the first major occasion in the United States in which an American and international group of professionals and public leaders has really gathered to examine in greater depth the themes, the recommendations, and the analysis which the World Commission's report provides.

This is not a one-shot exercise which is designed to prescribe the furors for all of our environmental aims. The Commission, I remind you, was established on the initiative of Mostafa Tolba as executive director of UNEP. UNEP's governing council will certainly be considering its implications. But its implications go well beyond the mandate of UNEP and the conventional description of what comprises 'environment.' They really go to the heart of the way in which we live together on this planet, the methods by which we cooperate, and the kind of future that we share.

I will not summarize this report for you, but I will simply say that it is an upbeat one. It is in the true tradition of Rene Dubos -- that trends do not necessarily mean destiny. It does, of course, point out the very real dangers to our common future that arise from the continuation of the destructive processes that have accom-

panied our economic growth in the past. But far from despairing, it points out that we need more, not less economic growth; that economic growth is indeed imperative if we are to resolve the problems of environmental degradation and the problems of overwhelming poverty that drive the people of the Third World to destroy their environment.

It says not only that a new era of economic growth is imperative in the next century, but that such an era of economic growth is feasible. But only if we change our ways; if the dynamics, the content, and the direction of economic growth are significantly changed so that they do not consume and destroy the very resources on which continued economic growth depends.

The report makes it very clear that this requires new dimensions of international cooperation and a new approach to the common management of our future on this planet; that 'environment' cannot be considered just another activity on the fringes of our economic life; but rather, that environmental considerations must be imported into the culture and to the processes by which we deploy our economic energies; and that any growth that does not combine environmental security and environmental protection with economic progress will simply not be sustainable.

As was said last night, we, the Commission, did not coin the expression, "sustainable development." That was given us in our mandate. We do believe we have presented a convincing case that sustainable economic growth is the only kind of growth that makes sense and the only kind of growth that will permit us to achieve this new level of economic progress to which we all aspire. We know there are parts of the report that are subject to challenge and that already have been challenged, but we believe that its essential message is one with which most of you will agree.

We hope that out of this meeting, you will provide many of the ingredients needed to translate this report into realities in our economic life, in our political life, in the development of our culture, and in our educational systems. If we do our job right in the period ahead, in the next century to which our work is directed, 'environment' will become so much integrated into our whole approach to our life on this planet that it won't be just another sectoral activity: it will be absolutely indispensable to everything that we do. Our job as environmentalists is to ensure that "the environment" becomes not just another issue, but a central element in all of our culture, in all of our economic life.

ACCEPTANCE OF THE ONLY ONE EARTH AWARD

Mostafa K. Tolba

Looking back to the late 1960's, we now realize that if there was one single starting point for the environment movement, it was the publication of the first picture of Earth from outer space, a tiny button of color and life in the endless, dead void of space. Only then did we begin to realize how fragile is life on one of the smallest planets of our solar system. That image lives on with us; we never tire of it, it inspires us still. Unconsciously, I suppose, it inspires me also.

So to receive the Only One Earth Award is a very special honor for me. To be receiving recognition for playing a role in helping to preserve the web of life on our small planet is something I greatly treasure.

But in doing so, however, I recognize that I owe a great debt to Rene Dubos and Barbara Ward, who played such a seminal role in starting the environment movement. Were Rene Dubos and Barbara Ward with us today, they would be distressed to see that so many of the threats they perceived still remain to be addressed.

But I also think they would be encouraged to see that at long last the environment has moved to the top of the international agenda. They would recognize that we stand on the brink of an environmental renaissance.

And now that I am receiving this Award, my mind turns to colleagues, past and present, who have done, and are doing, so much to safeguard the resources of our one earth.

First to mind is Maurice Strong, who mobilized the world opinion to see and understand the nature of the environmental crisis through his preparations for the Stockholm Conference. And now comes Mrs. Gro Harlem Brundtland and Mr. Robert Anderson, who respectively have done so much to take the environment into politics, into the boardrooms of businesses and more importantly to the ordinary person, to the public at large. We are proud of what Gro Harlem Brundtland and her fellow commissioners have done over the past two and one-half years, culminating in a frank, forward-looking report charting "our common future."

My mind also turns to the offices in which I work over there in Nairobi. We have a team which works on ozone, a group of men and women who have been working with the scientists, lawyers, diplomats, businessmen, and soon ministers to protect the world's ozone layer. By the end of this year we will have an internationally binding agreement that will cut back on the chemicals we believe are damaging the ozone layer.

We have a team that works on marine pollution. For a decade they have been bringing together the governments of various regions, helping them to monitor pollution, to control its land-based sources, and to restrict dumping at sea. In total, over 120 nations are involved.

We have a team that works on toxic chemicals, monitoring the spread of chemicals across the earth. Our greatest satisfaction is to see that industry and governments are joining in preparing for emergencies like Bhopal and Sandoz -- early warning systems, contingency plans, higher standards of safety. These people working in UNEP share with me my greatest honor: the feeling that we are, as a team, doing something to make sustainable development a reality.

My mind also turns to the people outside of our organization. My mind turns to the woman in Mali who designed a simple mud stove that uses less firewood and makes less smoke. My mind turns to the Chipko people of India who have said that they will die before they rob their children of the forests that provide food and work for their people. My mind turns to the rubber-tappers of Brazil, people who use the wealth of their forest without destroying the trees. Their reward is a better world.

It is very simple really. Preserve the world's riches, and we will prosper; destroy the world's resources, and sooner or later -- usually sooner than we think -- we open the door to poverty, to violence, and ultimately to famine.

There is a children's story about a farmer whose goose could lay golden eggs. One day the farmer killed the goose for meat. He killed the goose, and that was the end of the golden eggs. Children have no problem understanding the moral of the story. Why do adults? If that simple message gets through to the hearts and minds of every school child when he or she goes off into the world then I will be very happy -- I will want no greater reward. This earth is the goose that lays the golden eggs. Let's learn to treat that goose with respect.

Ladies and gentlemen, as the Award says, there is only one earth. My greatest honor -- the greatest honor for all of us dedicated to the preservation of the environment -- is the prospect of passing on that earth intact to a new generation. Passing it on to a generation that is hopefully better equipped than we have been to look after the lonely planet.

I will keep this award in my office, to remind me of that obligation -- of that honor. Thank you.

**SUMMARY SESSION AT THE UNITED NATIONS GENERAL
ASSEMBLY HALL**

OPENING ADDRESS

H.E. Ambassador Tom Eric Vraalsen

Ambassador and Permanent Representative of Norway to the United Nations

I am very pleased to have been asked to chair this special and concluding session of the Only One Earth Forum.

Firstly, as the representative of one of the governments with a deep and active interest in the United Nations, let me say how very pleased I am that this special session is being held in this house. It symbolizes appropriately the close linkages which exist between the community of scientists, citizen groups, industry, and public policy leaders -- which we often (and I would say somewhat inadequately) refer to in the United Nations as NGO's -- and the agenda which we as representatives of governments deal with in the United Nations. It was this interaction between governments and the non-governmental community which made the United Nations Conference on the Human Environment held in Stockholm fifteen years ago such a landmark event.

It is fitting that the sponsor of this Only One Earth Forum, The Rene Dubos Center, bears the name of one of the truly great environmental scientists and leaders, Professor Rene Dubos, who jointly with Lady Jackson, or Barbara Ward, as she is best known, authored the Only One Earth report which inspired and guided the work of the Stockholm Conference. It is fitting, too, that the Forum has adopted the Only One Earth theme for this conference marking the fifteenth anniversary of Stockholm and the launching of the Report of the World Commission on Environment and Development.

The report of this Commission is unquestionably the single most important environmental milestone since the Stockholm Conference, and it will figure prominently on the agenda of the General Assembly when it meets in this very hall later this fall. I am proud that our distinguished Prime Minister Gro Harlem Brundtland was the Chairman of this Commission, and I would like to say how delighted I am at the tribute paid to her and to the Commission at the Only One Earth Awards Dinner which preceded this conference.

Let me say too, how pleased I am that the agenda of your Forum was built around the themes addressed by the World Commission on Environment and Development. This Forum is the first major international meeting at which the report of the Commission has been considered in depth. I want to say how impressed I am with the galaxy of talent, of wisdom and experience which you have assembled for this purpose and conference, and with the quality of the discussions you have had.

We will shortly be hearing a summary of the results of your discussions from your distinguished rapporteur, Gerard Piel. Following that, Dr. Mostafa Tolba, the Executive Director of UNEP, will be addressing us on UNEP's future agenda. And I can't think of a more auspicious way of concluding this important conference. For it was Dr. Tolba's initiative that led to the creation of the World Commission on Environment and Development; it is the Governing Council of UNEP that will be the first body to consider the report of the Commission in relation to its own environmental perspective for the year 2000 and beyond; and this in turn will be a prime ingredient in the General Assembly's consideration of these critical issues.

UNEP will, of course, also be responsible for implementation of many of the recommendations of the World Commission. The world community will continue to look to UNEP and Dr. Tolba for the leadership which will be required to ensure that the essential environmental dimension is fully integrated into economic policy and the development programs of the whole United Nations family. The confidence we all have in Dr. Tolba's leadership was appropriately expressed on Wednesday evening when you honored him with the Only One Earth Award, and I am delighted to join you in this tribute to him. The World Commission's report is designed to provide a new impetus to the strengthening of UNEP's role and new support for the important and expanding role it will have in the period ahead as the environmental conscience of the world community.

The World Commission Report urges significantly increased support for UNEP's capacity to provide guidance and support on the environmental dimension of development to all those other agencies responsible for various aspects of the development process. For sustainable development is not simply a sub-sector of development to be practiced by the environmentalists who preach it. The main message of the World Commission's report is that all development must be sustainable, and that this can only be achieved by the integration of environment and economics at every level of the development process. Those who guide and those who carry out economic policy in all countries, industrialized and developing, must make the transition to sustainable development. They must see it as an integrated part of their own responsibility, and they must be accountable for it. For this is the only way in which the era of new economic growth, which the World Commission Report says is both necessary and feasible, can be achieved. And economic growth is particularly essential in developing countries, where poverty both derives from and contributes to environmental degradation.

The governments who have recently received the report of the Commission are only now considering their responses to it: firstly, at the Governing Council of the UNEP which will meet in Nairobi shortly; then the Economic and Social Council meeting in Geneva, and finally, the next -- the forty-second -- session of the General Assembly, which is to be held here in New York. The Only One Earth Forum will make an important and a timely contribution to this process. And I want to convey to you all my thanks, that of my Prime Minister, that of my government, and in this I am sure I can speak for all my UN colleagues, our thanks to the organizers of this Only One Earth Forum -- to The Rene Dubos Center and to all those who have contributed to and participated in it. And I am personally

delighted to have this opportunity of joining you in the important concluding program which will now follow.

AGENDA FOR THE FUTURE

Mostafa K. Tolba

First allow me, Mr. Chairman, to express to you my very deep gratitude for the most gracious words that you extend to me and to the organization that I have the honor and pleasure of working for. For I consider what we have been doing to be our duty to the world and to ourselves. I also wish to express my gratitude to The Rene Dubos Center, to its Board, and to Bill and Ruth Eblen for their magnificent effort in the Forum we are now having and for their efforts in keeping the name of that great man, Rene Dubos, up in our minds.

Maurice, my dear friend, let me join you in expressing my deep appreciation to this Forum and its work. To tell you the truth, I never expected that in one and a half days we would emerge from the Forum with such a set of conclusions. We could not have done so without the magnificent effort of a rapporteur like Dr. Piel. There will be a report on the meeting because, although people could not agree on every single word of what the rapporteur has read out, there is definitely a general consensus about the issues. I am sure that my dear colleague, Bob Frosch, and his meticulous way of organizing things has had a great deal to do with this success.

Mr. Ambassador, let me also join you in your appraisal of the World Commission's Report. I think that my distinguished friend, Gro Harlem Brundtland, her Vice Chairman, and her fellow Commissioners performed a miracle by reaching a consensus among them in slightly over two years.

I think what is very significant about this report is that it brought to the floor, to the light, loud and clear, the whole essentiality of sustainable development. Where do we go from here? What are the pitfalls? What are the things that need to be done? It is food for thought, for governments and for the U.N. system, and I sincerely hope it will not be merely a one-shot exercise in the General Assembly, but a continuing subject of consideration and discussion to insure that we are going on the right track. On our side, UNEP, all my effort will be devoted to insuring that in our governing council it is not going to be a one-shot exercise. It will be repeatedly considered, it will be repeatedly taken into account until we see the light of the day. The recommendations must not be globally appraised and, in the normal cycle of forgetfulness, globally forgotten. So I pledge that we won't let that happen.

Mr. Chairman, this Forum is intended to commemorate the fifteenth anniversary of the Stockholm Conference, but it is more dedicated to a great man who made history before, during and after Stockholm, Rene Dubos. Rene Dubos once described himself as the despairing optimist. Dubos believed that although we had muddled along for thousands of years, this was no longer possible. The life-support systems of this planet were on the brink of breaking down. The ecological foundations of modern life were crumbling. We could punish our world only so much.

There is, in his own and Barbara Ward's words, **Only One Earth**. I think if Rene Dubos were alive today, he would still be exasperated, but he would also still be an optimist. I doubt that he would despair. Rene Dubos began one of his greatest works with a description of modern Greece. He was sitting on the bare hills of Attica, recalling Plato's work. The hills of this land are, in the words of Plato, "like the bones of a wasted body. The richer and softer part of the soil having fallen away and mere skeleton being left." It was a rather gloomy thought. The situation of the Mediterranean seemed even gloomier. That sea was on the brink of strangulation with petrochemicals and organic compounds. It is still rather grim, but things are changing. And if we stay the course, there is every reason to be optimistic, through governments thinking and working together, assisted by UNEP and its partners in the United Nations system. The worst danger has been headed off. The Mediterranean is now more swimmable than it has been for decades. The Mediterranean Blue Plan offers scenarios for sustainable development and the trend is getting better.

UNEP's lawyers and scientists have recently been looking at the pattern of industrial emergencies. Earlier this year, I presented a proposal in Cairo on industrial emergencies, later covered in the New York Times. I proposed a system of early notifications and mutual assistance, procedures for industrial emergencies. Not only has there been support from a large number of governments, but for the first time that I can remember, there has been a weight of support from the industrial establishment itself.

UNEP's economists, together with their colleagues in the Multi-lateral Development Banks (MDBs) have been looking at their activities in recent years. We have seen the economic and ecological folly of many projects, particularly projects which have cleared the forests of Latin America, which have swamped the fields of India and which have pushed to the brink of extinction many of Africa's most treasured species.

But now, after years of arguments and frustration, there are signs that things are changing. The group of MDBs that UNEP brings together every year is brimming over with new members. The banks are looking at the environment in a new light; there is a new way of thinking; the concept of sustainable development is catching on; the World Commission on Environment and Development Report has given full force to that idea. Perhaps most encouraging of all is the recent response and movement on the question of ozone and the greenhouse effect.

A breath of fresh air is blowing through the international community. At long last it is applying what we have been calling for over the past decade: sustainable development has become a major aspect of third world thought, and for the first time the environmental constituency has embraced bankers, politicians, businessmen and most importantly, the ordinary person on the street and the farmer on the farm. We hope that all of them will believe firmly in the importance of committing themselves to achieving sustainable development.

There are signs that would have rekindled Dubos's optimism. The work to which Rene Dubos devoted his life is beginning to pay off. It takes time to create awareness and even longer to change human values, but all of us are doing it. It is

our duty to turn understanding into action, to turn sympathy into a better environment. UNEP is a fairly small team. The problems of the world's environment are way beyond the scope of our budget and human resources. But nevertheless, we are setting, for ourselves and for the international community some targets for 1992, the twentieth anniversary of the Stockholm Conference.

They are perhaps ambitious, but the issues have to be dealt with and the mood of the world has never been better. At the heart of these targets is a clearer vision of development. In the years since Stockholm, we have come to realize that among the root causes of human and natural resource destruction are: inequitable development, regressive terms of trade, short-term economic decisions, lack of land reform, urban biased policies and arms overspending.

We need to create an economic and political climate in which governments and institutions will commit more financial resources to rational use of their natural resources as the foundation for sustainable development. Direct actions to reach those targets lie beyond our resources and our mandate, but with the present weight of popular support, with the keenness of government and with the expanding constituency for the environment, we can afford to be ambitious. In brief, our proposed 1992 targets are:

1) Climate -- We are working to get a binding agreement on the production and use of chlorofluorocarbons to protect the ozone before the end of 1987. We will work over the next five years for international agreements to address the central and real causes of climate change.

2) Shared water resources -- Overuse or misuse of water by one partner or another in a shared water system can lead to tension and even armed conflicts between neighboring countries. To head off this real prospect and to replace it by genuine cooperation, our objective for 1992 is to stimulate the creation of at least seven action plans with legally binding agreements along the lines of UNEP's regional seas program for major international inland water systems. Within ten days from today, the nations sharing the Zambezi basin in Africa will have adopted the first such agreement.

3) Land degradation -- By the year 2000, there will be an average of only .19 hectares of crop land per person in developing countries. Even if we halted degradation of the land tomorrow, the prospects for properly feeding the south would be bleak. Despite the recent famine in Africa, despite repeated warnings from UNEP and others inside and outside of the system, the world seems unwilling to face the developing crisis. The international system will not yet allow adequate funds to tackle the problem, but UNEP believes that there are signs of regional awareness of land degradation. So we are proposing national and regional programs for the most seriously threatened areas. The aim is better coordination and mobilization of additional resources. The target for 1992 is to reduce the land degradation rate by twenty percent.

4) Tropical deforestation -- At present rates, nine developing countries will have exhausted their broad-leaved forests within twenty-five years and a further thirteen countries will do so within fifty years. Without comprehensive measures,

destruction will be irreversible. UNEP's strategy is to support the implementation of the Tropical Forest Action Plan. The overall target is to achieve a positive balance between cutting forests and planting new ones. Our specific target in UNEP for 1992 is to maintain at least ten percent of existing ecosystems as protected areas. This should prove to be a very difficult target.

5) Industrial hazards -- Bhopal 1984 is etched in all our memories -- a tragic reminder of the dangers that come from the mismanagement of modern chemicals and modern industrial processes. Basel revived the worry and deepened the concern. Over the next five years, UNEP plans international initiatives to limit the threat of industrial hazards to humans and our environment. They include: development and adoption by 1992 of an international and legal instrument on information exchange on chemicals in international trade; development of a similar program to monitor and control transport of hazardous waste across national frontiers; completion of two conventions concerning notification and mutual assistance in the case of industrial accidents with potential transboundary impacts; and development of guidelines for a cooperative program among governments, industry, and local communities to identify, prevent and deal with industrial hazards on a local level.

6) Oceans and seas -- To manage the enclosed seas and the open oceans, we need regular assessments of their states. In UNEP's network, there are now over five hundred monitoring systems worldwide. We are working for globally coordinated monitoring of changes in the quality of the marine environment to support UNEP's worldwide set of pollution control agreements -- agreements which already represent a harmonized management approach for the sustainable development of our ocean resources and coastal areas.

7) Environmental management -- In the years since Stockholm, the suspicion that environment was an enemy of development has been turned on its head. The concept that environment and economic development are mutually reinforcing has won near universal acceptance, but successful integration of environmental considerations into economic planning to achieve sustainable development is still rare. So UNEP is giving top priority to the development of simple, inexpensive methodology for such integration, including environmental impact assessment, risk assessment, environmental cost-benefit analysis and environmental accounting.

So Mr. Chairman, ladies and gentlemen, doomsday is behind us. People are aware and keen to act. Governments, industry, banks and the public at large are ready to move. What we need now is less talk, less theory and more action. In the past fifteen years, UNEP has discovered -- sometimes the hard way -- its own limitations. In the final analysis, our success depends upon our ability to persuade governments and the public to do what we cannot.

We have recently taken a leaf from Rene Dubos's book. We have instituted an award system for the extraordinary men and women of this world who have dedicated themselves to showing us how sustainable development can work. We call this scheme **Global Five Hundred**. Our first group of winners will be announced in three weeks time on World Environment Day, June 5.

Ladies and gentlemen, our aim in UNEP is that by reaching the targets I have outlined this evening, we will have thrown a stone into water, having the ripple effect, stirring more action to safeguard the environment for future generations. It was Rene Dubos along with Barbara Ward who cast the first stone. They began the work which we must continue. I thank you.

A TRIBUTE TO RENE DUBOS

Lewis Thomas

It is certainly a pleasure to remember Rene Dubos. He was surely one of the great American scientists of his long generation. We Americans always claimed him as not merely our own but as one of our best. Indeed, those of us who knew him during his early and exuberantly expatriate years at the Rockefeller Institute -- which later became the Rockefeller University -- thought of him not only as an American scientist and professor, but as a proper New Yorker as well; a sophisticated, street-wise townsman.

We took an almost personal pride in having Dubos as a slightly idiosyncratic member of the American scientific community. We thought of his distinctive French accent as a small eccentricity, something he might one day drop. He never did. We always called him "Ronnie," never Rene. And now, on the occasion of this five-year memorial, the fact of the matter might as well be acknowledged publicly: Dubos was a quintessential Frenchman, one of the truly great French scientists of his long generation, a savant, French to the core of his mind. We Americans simply borrowed him and then kept him.

But I still claim he was a native New Yorker, and I cannot imagine him living for long in any other city. He tried Boston for a year during the early 1940s. I have an idea that it was during that year that he first thought of himself as a despairing optimist. Then he returned to New York in high spirits, home again.

Those of his friends who were physicians thought of him as a medical scientist and honored him for his long and remarkably productive years of bench research, especially on tuberculosis; and as well for his discovery of gramicidin in soil microbes, the forerunner of Waxman's streptomycin and all the later generations of soil-derived antibiotics; and ultimately what seemed to be the conquest of tuberculosis.

But of course, Dubos was not a doctor, even though he probably learned more about tuberculosis than any doctor alive, part of which he learned, as you heard and as few doctors do, at first hand. He was by any definition a basic scientist, absolutely obsessed by all of biology, spending his whole life puzzling over how living things work at their deepest level. It just happened -- and it happened, in fact, because of the flexibility of his French mind -- that some of the puzzles that engrossed him turned out to be useful and valuable for medicine.

Indeed he did a lot of worrying about the future of human health and of medicine for all the years up to the time of his death. He was not at all sure that the conquest of infectious disease was all that much a triumph or anything like a finished achievement, and he kept warning his younger colleagues on many occasions that new kinds of infection remained as a constant threat to human society. He kept insisting, sometimes to the puzzlement of his listeners, that the increasing unification of human society and the increasing density of the population would

surely someday bring new diseases into being, and he was quite certain that antibiotics, in whatever abundance, were not going to be the solution. He had a prescient mind, for sure. And he was especially afraid of what the new viruses might do.

He was about as deeply specialized as a researcher of his time could be. He was a bacteriologist, confined at his bench to studies of the smallest of free-living creatures, laboring over the biochemical details of their working parts and the details of the details. This kind of science is sometimes called reductionism and sometimes criticized these days as being so close a scrutiny of detail as to exclude any view of the whole affair. There is even an argument, mostly in non-science circles, over the relative value of "reductionism" and what is called "holistic" inquiry. I think as far as his own research went, Dubos would have no part of this argument, for he believed with all his mind that whatever he could learn at the most microscopic level about forms of life would surely have implications far beyond that level, both up and down and involving all of nature.

Dubos took nature for his life work. This is what he studied and wrote about. He wrote beautifully crafted scientific papers, several hundred of them, which still rank as masterpieces of technical exposition. And then he began writing essays which turned themselves into a series of books that made him even better known as a literary craftsman to the world at large than he had been as a scientist. He studied nature, he spent his life thinking and writing about nature and he held strong views about his subject. But he was not in any sense a real romantic, nor was he, in the dismissive in which the term is used these days, a mystic. Indeed, he was a more practical and pragmatic man than many of the environmentalists who came to rely on his insights.

He felt no special need, for example, for a wilderness, certainly not for the sake of wilderness itself. He believed that the man-made landscape of rural Europe, especially rural France with its cultivated fields and hedges and ditches and winding roads and ponds and long-since planted and nourished forests -- all this he regarded as a work of high art and he had no use for the thought that it would be better off returned to its original state of wilderness. He gave high marks to the innate good taste of the human mind when it worked in the spirit of proper respect for nature. What did concern him and always angered him was the notion of despoliation, of exhausting the earth's resources, of poisoning the well. I think his ideas have been taking hold and spreading and becoming part of human consciousness, part of what the historians will like to term someday, looking back, the thought of this period in the evolution of culture. And this is no small achievement for a man and a single mind.

I've been trying to think of the most useful word to describe what I think is Rene Dubos' feeling for nature: high regard, for sure; deep respect, as it runs through all his essays; puzzlement and wonderment, of course, since these are the occupational emotions of any scientist; but something else for which there can only be a simple word. What "Ronnie" Dubos felt for nature and what moved him through his long career as a working scientist, what drove him along as he evolved into a writer for the mind was a steady, balanced, and balancing emotion that never left his mind. It needs a strong word to describe it, and the most powerful single

word in the English language that I can think of is a mild sounding one that best suits what Dubos had on his mind. It was affection, a warm abiding affection for the whole earth, touched always with worry for its future.

A TRIBUTE TO RENE DUBOS

Jean-Paul Escande

There is only one earth -- we are sure of that; only one Dubos -- it seems also to be true. Let us try to understand how, from the beginning of his life his mind was constructed. Rene Dubos used to say, "The best thing you can do to make people understand difficult subjects is not to give them too many explanations, but rather to tell them stories of things." So let me tell you two short stories to show you how Dubos' way of thinking proved to be of great benefit in two different circumstances.

The first story is the antibiotic story. It is 1927 at The Rockefeller Institute in New York. Professor Avery, worldly recognized as the leading expert on pneumonia, is not entirely satisfied with his research. He knows the pneumococcus perfectly. That is a bacteria causing this serious disease. Along with Michael Heidelberger, Avery succeeded in separating a lot of different varieties of this bacteria. He knew that what makes the pneumococcus harmful is a polysaccharide -- a sugar surrounding the bacteria itself. Avery even discovered that whoever is able to effectively and selectively destroy the sugar in the body without side effects on the other cells of the patient will overcome and cure the disease. He had already been searching for a long time for the convenient substance but he had not found it.

One day at lunch in April 1927, Alexis Carel kindly introduced a tall, shy, gentle-mannered young Frenchman to Avery. This young man was looking for a job and his name was Dubos. Avery, careful, polite, listened to Dubos' story. Dubos had studied agronomics in Paris, Claude Bernard Street. Destiny is destiny. Then Dubos worked in Rome for a short time. In Rome he had become fascinated by a quotation from Vinogradsky. Vinogradsky wrote, "Bacteriologists are wrong in studying only bacteria in pure cultures in petri dishes. Bacteria must be studied where they normally live in the soil together." Dubos' prepared mind indeed was fascinated. He immediately made up his mind: now, at once, he wanted to learn soil bacteriology, and he thought that the best place to do that was the U.S. But where in the U.S?

From time to time it's rather difficult not to believe in destiny. On the boat on the way to New York, a man and his wife walked towards Dubos. The man said, "Oh remember, you helped us visiting the forum in Rome some weeks ago. I am Selman Waksman. I am a professor of soil bacteriology at Rutgers University." Dubos had found a soil microbiology teacher, and very soon a research program. That was three years before meeting Avery.

Now continuing to speak to Avery, Dubos told him, "To get my Ph.D., I worked on a rather trivial subject: how do soil bacteria manage to destroy cellulose." All of a sudden Avery became extremely interested, for cellulose is not very different from the polysaccharide he had tried to fight against. Dubos was unaware of pneumonia and pneumococcus, but he jumped at the chance. "Give me a

shovel, a garden, and all the same laboratory, I can set a trap for the yet unsought bacteria in the soil which certainly exists and is able to produce the enzyme, which in turn is able to destroy pneumococcal polysaccharide." He immediately proposed a research program to Avery.

After three more years of long hard work, Dubos met with success. Laboratory mice were cured from pneumococcal infections. What a triumph! In fact, the beginning of a triumph. And five years later, the triumph was almost realized. Pneumonia is going to be cured in man after being cured in high monkeys. Dubos is dreaming of laurels and awards. But life is not so simple. At this precise moment, German researchers announce the discovery of sulpha drugs. Sulphas work against pneumococcus and cure patients. It is a revolution. So, thank you very much and good bye, Dr. Dubos. Come and see us when you have something new.

In 1939 Dubos did have something new and very effective. This time he had taken soil samples from the Rockefeller Institute's lawn and found neither enzymes nor sulphas, but gramicidin, which in fact, is the first antibiotic. It is a very powerful drug which is effective at very low doses on an entire range of bacteria. On September 8 at the Waldorf Astoria where the Third International Congress of Microbiology was held at the outbreak of World War II, Dubos confirmed his discovery and predicted that bacteria and other microorganisms can be found in the soil or elsewhere which will be able to produce a quantity of hitherto unknown drugs. In fact, these Zauberkugeln, these magic bullets, Paul Erlich had announced decades ago.

At this time, almost no one in the world was concerned with looking for solution to infectious diseases in the soil. However, at least three people understood immediately what Dubos meant. The first was a journalist from the New York Times. He wrote, "Drug expected from a soil bacillus opened a new field of research." The second was Howard Flory, an Australian working at the Sir William Dunn School of Pathology in Oxford, England. He and his team immediately considered the great therapeutic value of a broth which they were working on for purely chemical interest. The name of that broth, coined ten years before and at the moment almost forgotten, was penicillin. The first paper published in the Lancet on penicillin as a chemotherapeutic agent describes very clearly how Dubos, Flory, and of course Fleming collaborated individually in giving penicillin to the world.

Then, there was Flory with the first patient cured in Cairo during the war. And the first person to understand was Waksman himself. He knew everything about bacterial antagonism in the soil and now in the fall of 1939 he knew one more thing: the semiprecious stones he had in his lab were in reality rough diamonds and they could be used to produce antibiotics in order to cure diseases. Five years later, he and his team discovered streptomycin, which was the beginning of the victory over tuberculosis.

Without Dubos, there would have been no antibiotics -- and more importantly, there would be no "ecological" or Dubosian way of thinking. Indeed Dubos was one of these revolutionary researchers Thomas Kuhn has pointed out as new paradigms founders. Why was he revolutionary when looking for new drug in the soil? He was because bacteria were mostly considered as bags of enzymes and not

as tools; because soil, especially since World War I was considered as a source of diseases, not of drugs; and finally because, not the least, the medical intelligentsia considered at that time that only natural body mechanisms could cure disease without killing the patients. Anything coming from the outside was considered garbage.

Why was Dubos able to think otherwise? Because from the very beginning, he was an ecologist. An ecologist has a very special understanding of life and of interrelations between academic forms of science. An ecologist thinks globally and acts locally and balances endlessly between a purely chemical understanding of life and a more integrated approach of life. This is the best way to justify the phrase of Jean Perrin, a French physicist, "The goal of science is to explain complicated visible by the simple invisible." All his life, it was what Dubos tried to realize.

Years after, to express his opposition to a purely chemical conception of life, Dubos wrote, "Life is more than the self-replication of nucleic acid and protein molecules supplemented now and then by a few mutational changes. It is more than the utilization of chemical energy for the synthesis and turnover of organic material. Life is a creative process, elaborating and maintaining order out of the randomness of matter and lastly generating new and unexpected structures and properties by building up associations which qualitatively transcend their constituent parts." This is what he meant by symbiosis.

Unexpectedly and unfortunately, however, people retained only the chemical aspects and commercial potential from the antibiotic story. Because from the beginning he loved to think globally and act locally and because from then on, biology became almost exclusively chemical, Dubos looked elsewhere. He had been a pioneer in the field of scientific ecology. So in 1971, Maurice Strong wrote to him: "This letter is to commission you formally to establish and serve as chairman of an international group of experts to prepare a report on the state of the world environment. The main purpose of this report is to help establish a conceptual frame of reference for the work of the conference on specific, substantive problems."

In fact, Barbara Ward had already been at work on this report for a long time and the report was almost complete. On July 13, Dubos wrote to Barbara Ward in a rather formal way, interested no more. "Dear Barbara: What a tour de force! Repeatedly I feared that your intense interest so excitingly obvious in the history of the cosmos and of life on earth would make you forget that the Stockholm Conference had a more precise conscience. But in each case, you brought the reader back naturally to practical issues." Then he listed details to be corrected without great interest. Perhaps the explanation of his attitude is given by these notes, written in bed: "Have lost twelve pounds during the past four weeks, which may be a good way of starting post- retirement life."

But on September 28, he had recovered. He wrote a new letter to Barbara Ward. We can find in it the same spirit we found in the first Avery-Dubos meeting: the will to go beyond. Here is the letter: "Dear Barbara: I have hesitated writing you with suggestion concerning the book because I know how difficult it is to change the structure after it had begun to develop its own genius. But Mr. Brian Johnson, with whom I spent a most rewarding hour last week, assured me that the

ideas I have in mind are quite congenial to you and would reinforce your own attitude. In brief, I believe that a) being human implies managing nature. I like to use the word "stewardship" precisely because it is somewhat ambiguous. Man acts as a steward either for a higher order of things or for mankind as a nonentity; b) the history of the European land and of several parts of Asia show that man can create out of wilderness new environments which are ecologically sound, economically profitable, and esthetically rewarding; c) nature is so resilient that it can be restored to a condition of quality if man provides help and guidance; d) implicit in my attitude is a kind of faith in man, the evidence of things unseen. Wherever free men are involved, trend is not destiny."

And Brian Johnson had been right. Barbara Ward was waiting for that. You know what happened after that. I hope that one day the correspondence between Barbara Ward and Rene Dubos can be published, because it is really interesting to discover how two different people all of a sudden meet together and can improve on nature and can improve on things. It is to celebrate this event that we are here today, thinking with great emotion about Rene Dubos and Barbara Ward.

The last time I was with Rene Dubos in his office at the now Rockefeller University, I asked him, "What do you think will remain of all your successful pursuits?" He remained silent for a few moments and then, with a smile and completely relaxed manner replied, "Nothing, you know, really nothing. I don't belong to the group of people for whom statues are made. I am a person who helps others pull themselves up." That is the proof, ladies and gentlemen, that an ecological way of thinking doesn't prevent anyone from being wrong at times.

WORKSHOP I:

FOOD, LAND AND HUMAN RESOURCE DEVELOPMENT: AFRICA

Chairman:

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President, Edward S. Ayensu
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Rapporteur:

Daniel G. Bates +
Chairman and Professor of Anthropology,
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Participants:

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| Louise Lennihan | Associate Professor of Anthropology, Hunter College, New York |
| Karen J. Morrell | Assistant Program Officer, International Women's Health Coalition, New York |
| Ben A. N. Mudho | Counsellor, Permanent Mission of Kenya to the United Nations, New York |
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CHAIRMAN'S INTRODUCTION

Edward S. Ayensu

First of all, I would like to extend a word of gratitude to this forum for thinking seriously about Africa and for setting up a specific workshop for handling the problems that are facing the continent. No continent has been as tested and torn in recent years as has Africa. The problems that have befallen the continent require, in my judgment, some very special initiatives.

As you very well know, people like Maurice Strong, Mostafa Tolba and others took some very important steps when the continent was falling apart. However, one good thing came out of that enterprise: most of the leaders of Africa finally became frightened. This fear provided the impetus for action. The leadership began to realize that if they didn't do something, the entire continent would fall to pieces. And so because of those difficult periods there were some very important initiatives. I would like to mention a few of these as we go along in our discussions.

Since January, I have had a number of discussions with the chairman of OAU -- the Organization of African Unity -- who happens to be the president of the Congo. And for the first time I'm getting a feeling that the leadership on the continent really means business. I think they feel that if they don't take the initiative and do something, they are going to be left with some very serious problems in the near future. Even those who have strict military governments are beginning to think very seriously about the subject area that we are going to be discussing this couple of days.

In February 1985, I made a presentation before the Davos Symposium and I reminded the audience that keeping our aid alive is the business of everyone and that it is very complicated. I posed two questions to them which I would also like to present to you. First, what will happen to our environment if we continue the present trends of exploitation without due care for the future? Second, taking into consideration the economic realities of our times, what should we do to improve the quality of the environment? I hope that in the course of these two days, we shall develop some sort of a plan of action. We should at least establish a framework from which to operate.

The infrastructures of Africa, particularly the natural ecosystems, have been weakened at the hinges by environmental mistakes in the past decade. This has resulted in severe deforestation, soil erosion, and pollution of air and water; Africa cannot afford to continue on this dangerous path.

Water is one of the major problems confronting the continent. Ironically, every year there are almost 4,200 billion cubic meters of fresh water flowing into the oceans. We simply do not have the basic water-harvesting techniques and the type of irrigation programs that we need to harness this water.

The technologies are here; some of them require serious modifications because of the environments in which we operate, but nevertheless the basic knowledge is available. Up till now we haven't made the type of concerted effort that we should to really turn this water into a useful resource. It is really unfortunate, because our farmers are still relying on erratic and outdated irrigation methods.

I believe that the time has come for those on the continent -- as well as our friends abroad who are trying to help us -- to think very seriously about the type of assistance we really want for the continent as a whole. Looking at both the renewable and the nonrenewable resources on the continent, we see that we've got some serious problems ahead of us, but we cannot do anything about it until we begin to focus on some very specific initiatives. Where do we start?

The scientists can continue to talk, but they are just wasting their time if the politicians don't listen. Those of us who have had the opportunity to mingle with these people realize how important it is to get the politicians to at least begin to understand the problems that we are discussing today. I know that some of our senior people are doing an awful lot to educate the governmental officials about the agenda.

There is one area of special concern to me that I would like to tell you about right now. During the past year and a half I've been spending a lot of time traveling through the African countries and it seems that the situation of our soils really demands some very special attention. Soil management, as you know, is really a fundamental requisite for both food and nutritional security on the continent. It is very important to remind ourselves that the soil degradation taking place on the continent is so complicated because our human and animal populations are increasing; in the areas where they are increasing, we need to increase our productivity to feed all these populations.

Just a decade ago we never even thought about African cities having populations of one million. But now, many of them are approaching that number. I'm hoping that in the very near future, we will be in a position to look at this particular problem.

The human resource problem is also one that is imperative. None of our countries can really develop by relying on relief from abroad without the necessary manpower at home to handle it. All the newly developed and rapidly developing nations are able to do what they are doing because, in addition to their aid from abroad, they've got the requisite internal manpower to handle their development. In Africa, we are relying too much on outside help and we are not focusing enough on the African manpower. I'm hoping that during the course of our discussions we will bring this subject up and hopefully we will get the message across to the leadership on the continent as well as to the people.

SUMMARY REPORT

Edward S. Ayensu

I think that it is important for me to say initially that, although we have been talking about Africa and all of its problems, we should remain hopeful about the situation. For in the midst of all these difficulties, there have been some notable successes. We should try to draw strength from those successes during the course of our attempts to help the continent.

The group felt that there is a need for planners and developers, especially those involved with African projects, to incorporate environmental considerations as early as possible in the course of the developmental process. We discovered that very often you will start to build a sewer treatment plant next to a river and then, when the thing is half built, the environmentalists come in and say that you can't build it there. We want to stop that. We want to get them on the drawing board and make sure that these considerations are put in place.

It was also felt by the group that there should be a major incorporation of the social sciences in our deliberations. The social sciences are usually neglected and the group felt that the uniqueness of the African society, environment, and culture requires that the social sciences play a pivotal role in the development process.

The group also felt that a lot of indigenous knowledge is cast aside when foreign planners and developers come to Africa. This type of attitude has really undermined the development process: the earlier the developers took some of the indigenous knowledge into consideration of their programs, the better the situation would be.

Also, the group felt that human resource development and institution-building should be a major factor in all the aid that the continent can generate internally and receive from abroad. A country cannot develop without having an indigenous human resource base and some significant institution building to make things happen. Here the group felt that the developed countries, particularly those donor countries, should return to their original philosophy. When the donor countries went to Asia, the first thing that they said was, "Look, these people need decent institutions from whence human development can be achieved." In Africa, however, there hasn't been much institutional work at all. Foreign aid in India helped to build twelve agricultural institutions, but in the whole of Africa, we have only IITA -- the International Institute of Tropical Agriculture -- to do everything. Perhaps if the donors go back to their old philosophy of helping, we might make some progress.

The next point that we discussed was that of land use and soils. Primarily, we need a decent soil research institute on the continent. Indeed, the original reason for establishing the IITA was to have a soil research institute in Africa, for without the soils, there is no food security. Unfortunately, because of the political situation, IITA ended up doing everything -- working on yams, cassava, plantains,

cocoyam, etc. Although IITA has done some very excellent work in developing certain crops on the continent, this does not negate the fact that soils have to be handled very specifically from now on.

In the area of health, the group felt that good health care on the continent is fundamental and that efforts should be made to improve the health care situation, especially for infants. In the course of our discussions, we concluded that water and water-borne diseases are serious health issues and that something special has to be done in those areas.

There is one problem that was mentioned, although it was not thoroughly discussed: right now one of the biggest problems on the continent is AIDS. Doing all the research externally is not going to help the situation: we have to do some research right there on the continent. Africa itself is the laboratory where we should be working, and the powers that be must begin to focus and do some research there. Important research is particularly needed in the social sciences because if we want to slow the spread of AIDS, some behavioral studies need to be done along with the research activities that we are going to have.

The group felt that the population problem has to be seen within the context of the governmental policies on the continent. Government policies tend to drive the people from the rural areas into the urban areas. We feel that a reversal of policies by our governments is really necessary if we want to change the trends of population, migration, and other connected problems.

The group also felt that food production must be given renewed emphasis. Although a lot of food is being produced on the continent, the truth of the matter is that we need to increase our food productivity on the order of 45% per annum. Even if we could do that, there would remain the problem of post-harvest food conservation. The type of storage facilities that we have now tend to promote food or crop spoilage. It really doesn't make sense when, with the little money that you have, you buy the fertilizers, the pesticides, the herbicides, and the tractors to produce tomatoes and you then turn right around to lose 60% to spoilage. There are some quality food storage facilities available: the technology is here, the knowledge is here, and by properly incorporating these into food harvest conservation schemes, we should be able to do much better than we have been doing.

Last but not least, we have the institutions. Obviously, you cannot do any of these things without the proper institutions in place. The group felt that the non-governmental organizations have done a yeoman's job during the course of the crisis and we are hoping that they will continue to do so. However, our governments and the business community in Africa haven't participated seriously enough in these enterprises; hopefully we will be able to get them to do so in the future. Our governmental policies need to be re-examined in order to enable the private sector and the NGOs to operate effectively.

RAPPORTEUR'S REPORT

Daniel G. Bates

The Workshop opened with Edward Ayensu, Chairman, requesting that participants who so chose should offer position statements or reports for brief general discussion. These were followed by the main charge of the Workshop, which was to arrive at specific policy statements or recommendations to guide further development activity in Africa.

Initial Statements and Reports

The following participants presented brief statements or reports, some modified by ensuing discussion:

Ridwan Ali, reporting informally with regard to World Bank policy, noted that in the last ten years since he first started working in Africa, he observed that African governments and officials are becoming increasingly aware of the role that environmental concerns must play in the development process; that agricultural smallholders are a key to mobilization of the environment and economic growth; and that there have been significant technological advances since 1972, which now make it easier to make an accurate environmental impact assessment. Nevertheless, given the decline in per capita aid given to Africa and the understandable focus of most governments on day-to-day debt management, the ability of most nations to manage their natural resources on a sustained yield basis will be hampered. He further noted that no real improvement in per capita output can be expected until population growth is slowed. Citing several specific plans and projects, Dr. Ali noted the Bank's commitment to environmental impact assessment and sustainable resource management.

Francis Conant spoke on the possibilities and limitations of using satellite-gathered data for agricultural assessment. He pointed out that if this is to be of use, African scholars will have to be trained in the interpretation of these data (particularly those sensitive to local conditions of land use), the data will have to be freely and publicly shared (not sold commercially), and such data will have to be integrated with data derived from many other sources. He emphasized the need for both foreign and indigenous scholars, planners and policy makers to integrate a social perspective. This would involve social scientists, African and foreign, working together at all levels in the training of African scientists an appreciation of traditional knowledge concerning land use, conservation, disease control and other environmentally significant issues.

Hubert Dyasi spoke on education and human resource development, and said that constructive environmental practices should build on the useful aspects of traditional knowledge and practices; should utilize existing social organizational forms to the greatest extent possible; should build local activities which have proven successful; and should proceed by first training local specialists to spear-head efforts at planned change. It is essential to eliminate the widespread

prejudices, shared by many African educators and officials, which denigrate local or indigenous knowledge and adaptive strategies. Further, local populations must be given a sense of power over their own lives.

Louise Lennihan spoke on the development of agricultural wage labor in northern Nigeria, the importance of smallholders in maintaining a high level of agricultural productivity, and the necessity for cooperative research by social and natural scientists on smallholder farmers. African agriculture is being rapidly transformed, but little is known about what motivates people to make decisions on cropping, labor deployment and adoption of new techniques. Despite this lack of data, administrators are frequently under pressure to move rapidly in implementing programs which all too often turn out to have been poorly conceived.

Lynette Rummel and **Rhys Payne** presented a paper entitled "African Agriculture: A Transnational Perspective." Their analysis was based, in part, on a review of conferences and international meetings organized between 1984-1986 dealing with food problems in Africa, that was undertaken by the Environmental and Societal Impacts Group at the National Center for Atmospheric Research. Despite the regional dimensions of the recent African drought, the most important lesson of the crisis was in fact the international response to food problems in Africa. There was a truly global response to the food crisis. The very important role that non-governmental organizations play in food aid was recognized, as were the transnational linkages of many private interest groups such as those in academic, scientific, and business communities.

Irwin Redlener, speaking as a physician involved in distributing famine relief and long-term development grants for "USA For Africa," stressed the global and chronic nature of famine. He focused upon the need to address the political and economic, as well as climatic, causes of famine and chronic deprivation in Africa. He noted the moral obligation of nations to refrain from promoting the diversion of resources to military activities or the exploitation of these indigenous resources to the profit of foreign powers. In addition, Dr. Redlener felt that the public in northern, developed nations should be educated about the basic concepts of long-term development, not disaster relief, as the real need in famine-prone regions.

James Sheffield said that the recent crisis in food production and distribution was caused more by errors in human judgement and poorly thought-out policies than by environmental events or technological failure. Even minor increases in levels of formal education and informal instruction in key areas will have a profound impact on productivity. In particular, he noted the beneficial effects of education and extension training of women, who are directly involved in influencing family size, child health and nutrition, as well as engaging in numerous productive activities. Human resource development should not be relegated to the "social service" sector of development planning; rather, it is central to any effort to raise food crop productivity, to improve nutrition, and to promote environmental conservation and family planning.

Sara Stuart reported on the importance of dissemination of information in a "decentralized" manner. For instance, one population can take inspiration from

the successes of others. This is often a far more powerful model for change than costly national mass media programs. One means of facilitating "horizontal" communication is through the use of video cassette programs. These are effective in raising local "awareness," and in motivating people to act for themselves. She also stressed the role of locally made video in raising awareness among policy makers and by serving as a vehicle for communication between policy-takers and policy-makers.

Kenneth Tull noted that there was a wealth of expertise in the experience of Africa's smallholder farmers. We must recognize that most African farmers have survived in the midst of great adversity and we should seek to understand their coping mechanisms. Areas for additional research include: the role of gathered foods in diet; indigenous plants which can compliment primary grains being consumed today; ecologically sound indigenous methods of cultivation that may have potential for increased yields; and the importance of genetic diversity in regenerative systems. (He uses the term "regenerative" because he believes that the standard term, "sustainable," represents a status quo relationship and lacks the dynamic for improvement which can be found in the definition of "regenerative.")

General Discussion and Recommendations

Since the 1972 Stockholm Conference, the countries of Africa have continued to experience a wide range of environmental problems and have developed a correspondingly wide range of short and long term solutions. In one important respect, given the challenges faced and crises survived, the African experience is one of success: despite great hardships the people and nations of Africa are not only surviving but adopting in innovative ways. While it is not possible to give either county or regional coverage, the following recommendations are intended to build on what has been learned and accomplished to date. The post-independence experience of most African countries might be viewed in terms of three inter-related transforming processes: political and redistributive centralization, economic intensification, and social differentiation. While the Workshop's recommendations are not organized around these transformational processes, they do explicitly and implicitly address some of the issues raised by them.

Processes of centralization are manifested in:

- Increased urbanization and the growth of national and regional centers. The primacy of capital cities has been amplified in almost every country, often overshadowing even-larger regional cities.
- National administrative or regulatory agencies have grown in scope and influence, touching the lives of most citizens even in remote areas. Decision making has thus become highly centralized and sometimes unresponsive to local concerns.
- Informational and communications media, together with the educational systems, have expanded under centralized control and direction, giving a decidedly "top-down" bias to the flow of information.

- Industry and commercial activity of all sorts, including processing of most export crops are concentrated in a few regions of a given country, and are directly regulated by centrally made policy decisions.
- Key agricultural inputs are distributed through nationwide agencies, and decisions concerning their prices, costs and availability often fail to take into account regional or local considerations.

These and other manifestations of centralized political control are closely related to what has often been referred to as national integration or "nation building." The point to be kept in mind is that, while centralization is not inherently wrong, one has to consider the limits and costs, as well as the benefits.

Processes of rural economic intensification and specialization in many African countries are manifested in:

- The increase in the importance of the formal sector and monetarization of the economy.
- Increase in land use specialization, including non-food export crops.
- Heavy farmer reliance on one or two cash crops or "anchor crops."
- Field consolidation in medium and high potential areas; the extension of intensive or highly specialized agriculture into ecologically "risky" zones.
- Involvement of many rural households in wage labor, including sending members to work in distant areas.

While agricultural intensification is essential to meet the food demands of a growing population, sustainable agricultural development requires that the limits to growth be considered as well as what might be negative long term concomitants.

Social and economic differentiation affecting rural peoples is closely related to the above, as manifested in:

- Marked distinctions in urban and rural housing and life styles.
- Increasing rural-urban contrasts in recreational activities and social services used.
- Rural poverty in areas of high agricultural productivity due to differential access to land, capital and labor resources.
- Increasingly marked interregional differences in living standards amplified by agricultural intensification in high potential areas.
- Growing rural unemployment as labor becomes less important relative to other agricultural inputs.
- Division of labor by sex and age increasingly reflects economic differentiation, with women and children of better-off families removed from farm labor.

While not all aspects of social differentiation result in inequities or have negative implications for long term environmental stability, they do raise important concerns for social and economic equity.

Recommendations for the Future:

- Environmental concerns must be incorporated in every project of planned change from the very onset of discussion and establishment of objectives. This should not be left until the engineering phase. Similarly, social impact assessment must be given a high priority. There should be greater recognition that the success or failure of any project or scheme rests on local population input in planning and implementation. Hence social scientists must be drawn into the development process to a far greater extent than they have been previously. Their involvement should not be relegated to the final evaluation of a project, but rather, their expertise should be utilized at the onset of planning.
- Successful economic and environmental planning must proceed from an awareness of and respect for indigenous solutions, traditional knowledge and expertise. Accordingly, much more scientific attention must be paid to the study of indigenous systems of land use, environmental knowledge and techniques of resource exploitation. This is not to assume that local methods, systems of land use and resource management are always sound from the point of sustainable resource management, but an understanding of local adaptations should form a point of departure for development planning. This will involve the training of African social scientists to a degree not yet seen.
- African educational systems, at all levels, should place an emphasis on inculcating an appreciation for environmental concerns and, in particular, stress the value of indigenous or traditional systems of knowledge and values as they pertain to natural resources. A substantial effort should be made to train local workers in or near their places of residence, with an emphasis on their contributing to (rather than replacing) indigenous cultural systems.
- Given that agricultural productivity has to be increased at a rate approximately 4-5% per year to keep up with food demand, research in this area is critical. There is an urgent need to establish capacity for soils research throughout the continent. Agricultural extension training centers must be adequately equipped and staffed, and new ones opened. More research should be undertaken on smallholder farming systems and on the social organization of farming communities. Research should be undertaken on the properties or characteristics of indigenous materials, flora and fauna, as well as on local ways of utilizing them. The key to a sound agricultural environment is the maintenance of diversity. This is true both in the animal and the plant kingdoms. In conjunction with agricultural research, there should be a focus on equitable distribution of resources. Research is needed on food storage and transport. Far too much food is lost each year because of waste in storage. On-farm storage systems, including traditional ones, should be emphasized.
- Governments should be encouraged to stress an environmentally and socially appropriate mix of food and cash crops. A sensible balance will entail a substantial "safety net" of locally available food stocks. Governments should remove policy disincentives to ecologically sound but innovative farming.
- Donor countries and institutions should return to an earlier policy of supporting "institution building." For example, there is an urgent need for the establishment of

educational and research facilities, including universities, agricultural research institutions and agricultural training centers.

- International agencies should assist in establishing a "hard currency" Food Reserve Fund, to come into play during these times of food shortages.
- Governments should be encouraged to establish realistic social security systems, particularly for civil servants, as this is the only means to ensure the growth of an effective and honest bureaucracy.
- African and non-African governments should work to encourage trans-African trade, particularly in food.
- Continued high rates of population growth threaten to undermine any development and destroy existing ecological systems. Accordingly, far more research is needed in the area of family organization as a basis for further family planning initiatives. Here, too, more research on women, sex roles and patterns of household labor deployment are required. Even fairly modest efforts in the education of women have significant consequences in reducing fertility and in improving child health. Such programs should be expanded.
- Governments should place more reliance on the "informal sector;" indeed, the main reason for the success of those projects which have succeeded is through the ability of individuals to work out "informal" solutions. Cooperating groups and networks of family, kin and neighbors are responsible for a substantial percentage of rural and urban housing construction, land clearing, herding and harvesting. Informal systems of marketing, pooling labor, capital and other resources often should be encouraged or, at least, tolerated.
- Further research, both technical and behavioral, is needed in the area of sanitation and water quality. Water-borne diseases are a major negative factor affecting the quality of life and the health status of most rural dwellers.
- Urgent medical, epidemiological and behavioral research should be directed to AIDS. While attention to this disease syndrome should not be allowed to overshadow the issue of water-borne diseases, clearly Africa's future will be affected by the course of the AIDS epidemic. African governments should encourage local and foreign researchers.

WORKSHOP II:
MANAGING HAZARDOUS SUBSTANCES

Chairmen:

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Rapporteur:

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| Harry W. Buchanan | Vice President, Celanese Corporation, New York (ret.) |
| Frank Eblen | President, International Risk Management Consultants, Inc., Texas |
| Joseph R. Egan | Attorney At Law, LeBoeuf, Lamb, Leiby & MacRae, New York |
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| Nancy Q. Keefe | Editorial Page Editor, Gannett- Westchester Newspapers, New York |
| Lester B. Lave | Professor of Economics, Graduate School of Industrial Administration, Carnegie-Mellon University, Pennsylvania |
| Robert D. Mutch, Jr. | Corporate Vice President, Hydrology & Waste Management, AWARE, Inc., New Jersey |
| Maria Pavlova | National Expert on Toxicology, Environmental Protection Agency, Region 2 Office, New York |
| George F. Pinder | Chairman, Civil Engineering & Operations Research, Department of Civil Engineering, Princeton University, New Jersey |
| Marilyn B. Reeves | Vice President, Natural Resources Coordinator, League of Women Voters of the U.S., Washington |
| Daniel Shilstat | Associate, Trust for the Future, Tennessee |
| Curtis C. Travis | Director, Office of Risk Analysis, Health, & Safety Research Division, Oak Ridge National Laboratory, Tennessee |

Ron Van Mynen +

Vice President, Health, Safety &
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Anne Von Riegen

Chairman, Bregoil Sponge
International, New York

Charles E. Ziegler +

Vice President, Administrative
Services, CIBA-GEIGY Corporation,
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+ Steering Committee

CHAIRMEN'S INTRODUCTION

Henrique B. Cavalcanti & William D. Ruckelshaus

Ruckelshaus:

Certainly the increase in public awareness of the problems of toxic substances has been a rather accelerated and frightening phenomenon over the past decade. By toxic substances, I think we mean those substances that are carcinogenic or that cause cancer either in test animals or in man. There are several elements to the political and societal reactions to the discovery of these substances in such widespread use in developed and developing countries.

Our workshop is going to focus on the nature of the problem: what are these substances that we are concerned about? How do we go about assessing the risk to man in the exposure levels that currently exist? What do we know about these risks? What do we not know about them, given that there is uncertainty in the nature of these risks? How do we go about dealing with these uncertainties in modern societies?

Then, having described the nature of the problem, we will move into what we are currently doing about it and how these risks are being managed in the United States and in other countries, developed and developing. That involves, again, an understanding of the role that has been assigned to governments, both national and international, and the role that either has been assigned, or should be assigned, or should be assumed by the generators of these substances, primarily industry, although, in some cases governments as well.

Finally, what role should the public play? We have attempted in many developed countries, including this one, to assign a very large role to the public to participate in the decision making process as it relates to regulating these risks. That assignment has not been a voluntary one by the politicians; it has been one demanded by the public, resulting, in part from their questioning the rigor with which the government is developing processes to protect them, and in part because of their deep concern over their exposure to the risks associated with hazardous substances.

In addition to the questions of public participation, we have the issue of communication. How do we communicate these risks to the public? Are we correctly describing to them the nature of the problem so as to elicit the right kind of response from those participants?

There is a lot of controversy surrounding all of these issues. We have established now, at least in the U.S. a virtual "cradle to grave" program for the handling and the managing of risk, all the way from the production, transportation, use and ultimate disposal. That program is, to say the least, imperfect. We are in the early stages of implementing it and we have found many problems in both putting it into place and in showing progress against the issues that we have identified.

Finally, we will reach the question of, given the nature of the problem and what we are currently doing about it, what changes should be made, what kind of recommendations can we come up with for action in dealing with these issues that will make our approach more effective?

In addition, the workshop will address the issue of nuclear power, one that arouses only objectivity in discussion. In the description of the body of the workshop itself is a quote from the World Commission on Environment and Development. It says, "The generation of nuclear power is only justifiable if there are solid solutions to the unsolved problems to which it gives rise." That sounds like a qualified waffle and indeed it is. If there was one sentence in this report that generated more discussion than any other, this is the one.

And what is it about nuclear power that generates so much emotion and gets people so excited? And how does that risk relate to other risks that we face, risks like exposure to hazardous substances? There will be some discussion of that in the workshop and I guarantee you there won't be any unanimity coming out of it. Out of any group of more than two people, we won't have a unanimous view on how those risks should be categorized and how they should be described and how solutions should be formed. But we are going to address that issue as well in our workshop and we hope to be able to come out at the end with a set of recommendations that will make some sense.

Cavalcanti:

I don't really have much to add, but I would just like to say that the four topics that we will be addressing are: nuclear power, toxic chemicals, hazardous waste, and risk awareness. As Bill mentioned, we are talking mostly about industry and we tend to think that that is in many ways confined to the developed world. But we are just now working on 15 so-called newly industrializing countries and we are coping with no less than 500,000 industrial establishments. So it is not only the physical, the personal population, but also the fairly large industrial population that has to be addressed.

We will be touching on specific priorities and, of course, we will do our best to remember that there are other priorities as well. So one of the roles of the chairmen will be to associate the specific topics with others that will be discussed at this event.

I hope that we will avoid language that is too technical, although precise definitions are indispensable. Also, stay away from purely national problems and try to draw a broader understanding of these same issues on a global basis.

Of course, our role will also be to feed workshop number five and to make specific suggestions for institutional strengthening. We need ways and means of rendering government more capable, making industry more responsible, having a scientific community as ethical as possible, the public more educated, and the media more conscientious.

SUMMARY REPORT

William D. Ruckelshaus

In the course of our workshop, we addressed two issues that are related in some respects, one being nuclear power and the second being the handling of hazardous substances.

While no agreement on the future of nuclear power was reached, all of us agreed that if nuclear power was to have a significant role in the future of energy generation, the following would have to be successfully addressed: some of the newer technologies involving nuclear power that are coming along needed to be pushed very hard and there needs to be a much better public understanding of the potential for these new technologies to eliminate the possibility of a cataclysmic failure, this being one of the biggest public concerns associated with nuclear power. These new technologies provide for much smaller plants, two to four hundred megawatts versus a thousand. They also provide significant potential for minimizing the waste problem.

Secondly, that we establish a siting process that is inclusive in terms of involving the public, that is not limited geographically. We must search for more remote areas which have adequate infrastructures to locate the plants, and we must have a much stronger sharing of information relating to the problems associated with nuclear power and the generation of electricity through it. Internationally, we must make sure that people are technically trained to manage nuclear power plants wherever they would be located before they are so located. There must be a separation of civilian uses of nuclear energy from military and whatever spread of nuclear power takes place in the future; that separation must be ensured through international agreements.

We then moved to the problems of hazardous waste and we defined what we were doing as: addressing the problems about the management, production, transportation, use and ultimate disposal of substances that may cause harm to man or the environment. We then discussed what to do about the management of hazardous substances in three areas: the role of government, the role of industry, and the role of non-governmental organizations or individuals. We looked at it from the standpoint of public participation and the communication of risk, and we suggested some areas of research on both the risk assessment and risk management side.

As to the role of government, we suggested that it is vital that governments insure that we have a system in place which protects the public and the ecosystems from harm caused by exposure to toxic substances. To do this it is necessary to put infrastructures in place, in the developing as well as the developed world, to carry out this responsibility. We suggested that a lot more attention be paid to a systems approach so that we don't simply move waste from one medium to the other as we've done in this country, claiming victory each step of the way. We should recog-

nize that pollution may be just matter out of place and we ought to decide where that place ought to be.

We endorsed a public participation process that works as a necessary element to a successful government program. A successful government program of this kind must insure that decisions are made in a timely way with real involvement on the part of the public. We agreed that it is better to involve the public and that if you didn't, you wouldn't get anything done anyway, so it was in your enlightened self-interest to insure that some kind of public participation process was in place.

We suggested: that more research involved in all of these things be sponsored by the government; that the government emphasize those areas of research that had to do with both assessment and management of risk; and that the developed countries have some responsibility to do some research that would assist the less developed countries.

As to the role of industry, this we defined a little more simply. In the first place we ought to obey the laws. What we mean by obeying the laws is not just the letter of the law, but what those laws might become in the future. For instance, if an industry were to be located in a developing country, they should anticipate that some of the standards that now apply in developed countries will eventually apply there. They must anticipate the necessity of bringing the local communities and the governments along with them in applying certain health, safety and environmental standards. They must develop their own public participation process which will provide a level of support in the community and government for them when and if any kind of stress were to occur in the future. Finally, it would be advisable to do as several of the corporations in the developed and developing worlds have already done and that is to adopt an ethic inside the corporation itself associated with protecting the environment, protecting public health, their employees, the surrounding community, and any other stakeholders in the enterprise.

As to the role of individuals and nongovernmental organizations, certainly the watchdog role of these organizations is emphasized and is important, as well as the brokerage, arbitration and repository of information. Education is a very important function for government and industry, but certainly the nongovernmental organizations must educate not just their own members, but others in the society as well.

Several people in our panel mentioned the importance of the professional organizations becoming more actively involved in the public policy-making process. These professional organizations must develop self-regulatory mechanisms, guidelines that insure that they will pay more attention to environmental and hazardous waste kinds of problems.

Finally, instead of the confrontational approach that has often been taken, we must encourage cooperation across all of these sectors -- government, private sector and nongovernmental organizations. In fact, we would do well to emulate the successes that can be seen from a cooperative approach as opposed to the constant confrontation which seems to underscore so much interaction in this area.

There was also emphasis placed on international cooperation as another important element to show progress in the area of controlling hazardous waste.

The last two pieces which are subsets of the rest are: what do we mean by a successful public participation process? The public is involved in the decision-making process, certainly in the developed world, and even in those developed countries in which public opinion is not a prominent part of the process right now, the suspicion is that it will become so before long. We started with an assumption that the issue is not whether, but how. Not whether the public will get involved; they already have demanded to be part of the decision-making process, but how do we do it? The truth is that we are in the very early stages of understanding how to successfully involve the public in the decision-making process.

There was also the thought of a need to empower the public so that it may actually participate in the decision implementation. One suggestion concerned monitoring stations around the emissions of a particular plant: the public could operate these and if any violation of the standard associated with that monitoring occurred, the public would have some power to actually close the plant until the problem was corrected.

The final element was that of risk communication. We wanted to emphasize at the outset that by risk communication we did not mean the need to educate the poor ignorant public about the nature of these risks so that they could all see them in the same way that the risk assessment experts did. We needed to start with an understanding of how the public viewed these risks now, what was it that concerned them about the risks, why were they demanding so much government involvement in risks that "experts" might think were relatively slight, and a realization that communication with the public goes two ways. It is both a communication from the decision-making government, industry, and NGOs to the general public, and it is an openness, a receptivity to getting that information back so that there can be a greater understanding of the process itself.

We thought about risk communication as a piece of the public participation process. If you are going to involve the public in these decisions, it is necessary to develop ways of communicating with them about these risks that put in front of the public the best understanding that is available in the scientific community at that point as to the nature of the risk. In this way, the public are dealing on the same level with and understanding of what the problem is that we are addressing and what it is possible to do about it.

Finally, we discussed the question of what additional research we need. There was a strong consensus that, while we have some research now, we need a lot more. The amount of money that we are spending to try to do something about the problems of hazardous substances is far exceeded by the amount of damage being done to public health and the environment by these substances. There is simply an urgent need for societies to put more resources into understanding the nature of the problems, evaluating what we are now doing to solve them, and moving forward with additional options for addressing them.

We broke down research in this area into risk assessment; looking at the biological, medical, environmental research; technological research; does risk assessment lead to better decisions?; what were the kinds of things we could do differently than we are now doing to handle the problem?; what were the options that we had?; what kind of incentives, disincentives, regulatory activities could be undertaken to make more progress? We thought a lot about the necessity of looking at cross-national approaches to risk management, in terms of what worked and what did not work.

Finally, in recognition of the value-laden nature of our discussions, one of our group suggested that what we need is less poison and more love in the world, and with that I will close.

WORKSHOP III:
SUSTAINABLE AGRICULTURAL ECOLOGY

Chairman:

Benjamin C. Dysart III +
Past President and Chairman of the Board National
Wildlife Federation, Washington, D.C.

Rapporteur:

Donald R. Lesh +
Executive Director, Global Tomorrow Coalition
Washington, D.C.

Participants:

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|-------------------------------|--|
| Brent Blackwelder + | Vice President, Environmental Policy Institute, Washington, D.C. |
| Calvin DeWitt | Vice Chairman, North American Conference on Christianity and Ecology, Wisconsin |
| William Duchie | Manager, Environmental Programs, Shell Oil Company, Texas |
| Mads Faegteborg | Secretary of Inuit Circumpolar Conference Environmental Commission, Denmark |
| Ralph I. Freudenthal + | Director, Product Safety Department, Stauffer Chemical Company, Connecticut |
| Joseph L. Goldman | Director, International Center for the Solution of Environmental Problems, Texas |
| Richard Gordon | Professor of Agribusiness Management, Division of Agriculture, Arizona State University |

| | |
|-------------------------------|---|
| Wendy Gordon | Science Associate, Natural Resources Defense Council, New York |
| Charles A. Howell, III | President, Trust for the Future, Tennessee |
| Peter D. Jacobs | Chairman, IUCN Commission on Environmental Planning, University of Montreal, Canada |
| Daniel H. Janzen | Professor of Biology, University of Pennsylvania |
| Karen B. Kress | Vice President-Operations, National Parks and Conservation Association, Washington, D.C. |
| Finn Lynge | Coordinator of Inuit Circumpolar Conference Environmental Commission, Denmark |
| Red Pedersen | Minister of Renewable Resources, Government of the Northwest Territories, Canada |
| Darrell Piekarz | State of the Environment Specialist, Environmental Analysis Branch, Environment Canada |
| David B. Porter | Minister of Renewable Resources, Government of the Yukon, Canada |
| Robert Rodale* | Chairman, Rodale Press, Pennsylvania |
| Rodger Sedjo + | Director, Forest Economics and Policy Program, Resources for the Future, Washington, D.C. |
| Nancy Wright | Consultant, Earth and Ecological Studies, Wainright House, New York |

* Convener
+ Steering Committee

CHAIRMAN'S INTRODUCTION

Benjamin C. Dysart

In workshop three, we are also going to be focusing on a small number of major points identified by the World Commission. This is the challenge facing nations today -- we no longer have the option of deciding whether conservation is a great idea or not, but we have to get on with implementing it. I think that if all of us are positively oriented, as I am and as the Dubos Center is, then we must focus on how we can get the government, private sector, citizens and so forth, to facilitate the implementation of conservation and wise use.

The second topic that has been suggested for us to focus on is the matter of sustained yield and productivity of our land, water and forest resources, much of which is being degraded and much of which relates to agricultural productivity.

I think that we have to unite conservation and agriculture. This is an effort that many people in this country and around the world have worked on for a long time, but I think we can try to find some ways to facilitate that further.

The third point that has been suggested for our workshop to deal with is the matter of cooperation between non-governmental organizations and citizens groups. Mr. Ruckelshaus pointed out that many of our citizen's groups in this country and around the world have taken a very active role and have thrust themselves into the process and are insisting that they be at the negotiating table. I believe that there is a major role for citizen's organizations in our society.

I have had the opportunity to serve as one of the leaders of the conservation community in this country and I'm familiar with the opportunities as well as the difficulties and the challenges of turning that interest into effective results. Anything that we can do to suggest some ideas to promote constructive and effective public involvement along these lines will be very helpful.

In the three sessions we will have in this particular workshop, I look forward to coming up with some concrete recommendations and ideas, based upon the great talents of the people who are there and the thought that has gone into preparing background papers for this conference.

SUMMARY REPORT

Donald R. Lesh

It is fair to say that our group provided a triumphant confirmation of the fact that in ecology everything is interconnected. We managed to discuss issues ranging from West Tennessee to East Africa, from the Arctic to the tropics; and we proved that it is necessary to see the whole if we're going to focus on any part of the specific picture.

In our group we realized that we had certain limitations. We represented basically a North American view of the problems. We decided we had no choice but to live within that perspective, but we did our best to be sensitive to other perspectives and the Third World view. We also realized that among our two dozen members, very few were actually involved in direct practical farming or agriculture. Many had experience with the theories and the practices, but not the actual farming of the land.

We therefore adopted a very broad definition of agriculture: the process of providing food, fiber, materials, and medicines in order to meet human needs and demands. We approached the description of this area from three major viewpoints: 1) philosophy and ethics, which was best construed as a vision, or the big picture; 2) issues and policies, which were the immediate problems and concerns; 3) institutions and strategies, which were the solutions and attempts to change things to accommodate to our view of the future.

For each of these, subgroups were set to provide us with drafts which we hope will show up in the final report as appropriate blends of science, technology, economics, engineering, and poetry. I can only give you some quick key words in these areas to give you a sense of what we talked about. In the philosophy and ethics, some of the phrases used were: stewardship, wise use of resources, intergenerational and interspecies responsibilities, community, regenerative approaches to agriculture, and an appreciation for the esthetics and beauty of nature as values within this area.

Under issues and policies, some of the bywords or catchwords were: high input and low input technologies; population growth -- for indeed, if one must talk about sustainable agriculture, one must think not only about the supply side, but the demand side; the population growth linked with the very serious phenomenon of urbanization throughout the world, which often leads to a loss of understanding of the farms and the land and indeed an alienation from rural values; and biotechnology.

In terms of institutions and strategies, we spoke at some length of the need for multilateral development banks -- the World Bank in particular -- to understand that there is a great need not to force the production of cash export crops at the expense of producing subsistence food in Third World countries. The international community must understand the need for some kind of debt forgiveness or

debt accommodation which could be associated with mechanisms that provide for greater respect for and conservation of nature and natural resources throughout the world.

We spoke of incentives, the fact that there are driving forces which must be included in all these solutions. We recognized the fact that not only taxes and subsidies are incentives and driving forces, but that a conservation ethic can be a driving force as well. We stressed that under all of these solutions or institutional changes the solutions must be close to the people involved. They must be done with a sensitivity to their needs, their concerns and their aspirations. For indeed, if they fail to take account of that approach, they will not be effective. There must be a sense of empowerment of the people most directly affected.

Our group was particularly enriched by the presence of five or six Canadian members and particularly three who represented not only Canada but the far north regions, the Yukon, the Northwest Territories, and the Inuit Circumpolar Conference. Their views were particularly valuable in reminding us of the relativity of our perspective.

If you are living in the north of Canada in those areas and you live on permafrost, you cannot be too concerned about ground water pollution because you don't have any groundwater. You cannot be too concerned about the growth of cereal grains, because you live on tundra and principally subsist on a sustained yield approach to harvest on wildlife. What this brought home to us was the need to respect the traditional wisdom and cultural values that have insured, throughout the world, sustainable yield situations for centuries, often in very harsh and very unforgiving surroundings.

It was pointed out that the peoples of the far north want wise use, not no use. I felt a certain kinship in that with what Robert Rodale said about the attitude of farmers who want to live not in a scientific regime, they want to live as they would choose to live, but with the very best that is appropriate to their needs and can be derived from science and technology.

The feeling of our basic approach was perhaps captured in what Charlie Howell said: "Through a caring, inspired stewardship, we move toward a willed future with sustainable development. To this end each person and institution must be empowered to share the stewardship which will honor the esthetics and integrity of creation, will honor wise use of natural resources, and will honor and maintain the interconnectedness of the web of life."

Dan Janzen said something quite similar: "We must realize that in the age-old struggle of humanity with nature, we've won. In fact, we've beaten the hell out of nature. Now is the time to look back and decide what's worth saving."

RAPPORTEUR'S REPORT

Donald R. Lesh

I. Background.

Participants in the workshop were reminded at the outset of Rene Dubos' comment that interrelationships between living things and their environment

... are always influenced by the human presence, which introduces an ethical component into all environmental problems. Since the nature of our activities determines the extent and direction of environmental changes, ecological thinking must be supplemented by humanistic value judgments concerning the effect of our choices and actions on the quality of the relationship between humankind and Earth, in the future as well as the present.

The dialogue in this workshop may perhaps best be understood as the application of a broad spectrum of humanistic value judgments -- with perspectives ranging from West Tennessee to East Africa, and from the Arctic to the tropics -- to the critical issue of sustainable agricultural ecology.

The approach taken in the workshop, by consensus, was very broad, viewing sustainable agriculture as a subset -- albeit an extremely important and complex subset -- of the conservation ethic worldwide. Even the definition of "agriculture" was construed broadly as

the process of providing natural foods, fibers, materials, and pharmaceuticals to meet human needs and demands.

That definition made possible the inclusion in the workshop not only of issues related to the conventional concept of farming, but those related to forestry and even the sustainable harvest of animals in traditional societies to meet individual needs for food, clothing, and materials, and for commercial uses.

II. Process.

At the suggestion of the Chairman, each participant was first accorded an opportunity to present brief opening remarks, identify his or her organizational affiliation and special viewpoints, if any, on the issues under discussion, and describe any relevant activities or programs currently under way. In addition, many of the participants submitted written papers or statements on the topic of sustainable agricultural ecology for inclusion in the proceedings of the workshop.

Second, in response to the Chairman's challenge that the workshop must produce not only opinions and comments but concrete suggestions, proposals, or

programs for action, participants agreed to structure their discussions in three major areas:

- A. Philosophy and Ethics (VISIONS).
- B. Issues and Questions (POLICIES).
- C. Institutions and Strategies (ACTIONS).

Third, at the close of the discussion, individual participants or groups of participants volunteered or were requested to prepare specific written comments in these areas. These were reviewed and approved by consensus, and together form the written statement of Workshop III with which this report concludes.

Although this process sounds highly structured and formal, the Chairman skillfully assured throughout the workshop that discipline was tempered with respect for the right of the individual to free expression of ideas and opinions, and much of the vigor and pertinence of the discussion derived from spontaneous personal comments rather than consensus statements. This report therefore attempts, where appropriate, to include such comments with as much as possible of their original flavor.

III. Summary of Opening Remarks.

Brent Blackwelder, Vice President of the Environmental Policy Institute in Washington, D.C., noted that EPI, which has been in existence since 1972, places its emphasis on policy issues with a primary focus on Congress. Issues of agriculture, fresh water, and the environment are of central importance, and in terms of experience several EPI staff members are now senior to the congressional staffs and Members of Congress with whom they deal.

In agriculture, EPI is stressing three policy areas with great significance for the future:

A. Regenerative agriculture, involving lower intensity of fossil fuel inputs, energy conservation, and systematic return of natural nutrients to the soil;

B. Biotechnology, employed in a prudent manner, and not, as at present, to reinforce the high technology approach to agriculture predominant in affluent industrial nations (Blackwelder cited the book Altered Harvest by Jack Doyle as a useful reference); and

C. U.S. foreign assistance, and the role of the United States in multilateral development institutions such as the World Bank. Too much U.S. foreign assistance, he felt, has been based on large-scale, high technology projects with frequently disastrous environmental and development impacts. The evidence amassed in some 18 oversight hearings in Congress demonstrates that much greater benefit could be derived from smaller-scale projects stressing regenerative agricultural techniques, low-input strategies, protection of tropical forests, and closer involvement of indigenous peoples. The special weight accorded to the views and votes of the United States, as the leading donor nation in the multilateral development banks, provides us an opportunity to exert positive influence on the direction of

development assistance. Some progress in this effort is taking place, Blackwelder noted, and the actions and statements of Barber Conable as the new President of the World Bank offer encouragement. But much more can be done with wider grassroots support.

Ralph I. Freudenthal, Director of the Product Safety Department of Stauffer Chemical Company, explained that his work emphasizes issues of toxicology and regulatory affairs. Describing himself as a long-time supporter and admirer of Rene Dubos, Freudenthal underlined his strong belief in the importance of technology and scientific ingenuity in the field of sustainable agriculture.

The key, he felt, is to assure that new products have both global value and benign environmental impacts. While unreasonable risks must be avoided, new and innovative technologies are urgently needed to expand world agricultural production to meet increasing human needs.

As positive examples of safe and effective insecticides and herbicides especially for use in Third World nations. The safety factor is of particular importance because the levels of exposure in the field cannot always be adequately controlled. Some of these new insecticides avoid the pitfall of past reliance on toxic chemicals entirely, by finding new ways to induce corn plants to produce their own insect toxins against corn borers and corn root worms.

B. Advances in the application of biotechnology, for example to create microorganisms that will naturally combat the breeding of mosquitoes and thus help reduce the incidence of malaria in the tropics. There are great global benefits to be derived from such research, said Freudenthal. Strong scientific controls must be imposed, but there is a real potential of enhancing both productivity and yields in Third World agriculture on a sustainable basis by such means.

Donald R. Lesh, Executive Director of the Global Tomorrow Coalition, explained that 110 organizations are now members of the GTC, which he described as an experiment -- now six years old -- in trying to encourage more creative and foresighted policy decisions today, especially in the United States, in response to global trends observed in environment, population, resources, and development. At the heart of all GTC efforts, Lesh noted, is the concept of sustainable development, of which sustainable agriculture is clearly a key component.

As a small central office serving the information and communication needs of a large circle of diverse member groups, the Coalition does not itself conduct research, but makes the results of member-group research more widely known through community-level public conferences in the Globescope series, publications of various kinds including the book-length Citizen's Guide to Global Issues, and a new program of preparing curriculum materials for teachers at the upper elementary and secondary levels on long-term, global issues.

Lesh stressed the GTC focus on understanding the interaction among key global trends as the key to sound policy decisions, and particularly the need to see the linkage between population growth and sustainable development. It had become increasingly clear -- for example, from authoritative sources such as the World Bank's 1984 Annual Report -- that otherwise well-conceived development

programs could fail to generate per capita growth in economic well-being if they neglect the critical aspects of family planning and population policy. In considering sustainable agriculture, Lesh suggested, one must look not only at the supply (food production) side, but the demand (population growth) side, of the equation to find appropriate answers.

Wendy Gordon, Science Associate in the New York office of the Natural Resources Defense Council, noted that her own concentration is on water pollution, while NRDC programs encompass air, water, pesticides, groundwater, wetlands, soil conservation, public health, multi-lateral development assistance, and many other environment- and resource-related issues. With active and well-staffed offices in New York, Washington, D.C., and other U.S. cities, NRDC has long been in the forefront of non- governmental organizations active on environmental policy and regulatory questions. Since her background was not in agriculture, Gordon added, she would participate in the workshop mainly as an observer.

Daniel H. Janzen, Professor of Biology at the University of Pennsylvania, explained that -- as a tropical ecologist and devoted field worker -- he has spent the preponderance of his time in Central America for many years rather than in teaching or research in the United States. Since he would have an opportunity to speak at greater length in a plenary session of the Forum, Janzen said he wanted to make only five brief points:

A. One of the biggest philosophical hang-ups we have in dealing with tropical ecology is that we too often treat the indigenous people as "draft animals". We fail to think of their minds, and the important resources of tradition, culture, and natural understanding they offer.

B. For half of the tropical areas of the world, it is already too late: there's nothing left to conserve. Rather, there is a need for a new biology of restoration ecology to try to find viable fragments of what has been destroyed and return designated areas to something approaching their former natural state.

C. The academic community, in his opinion, has ignored its true responsibilities for a long time. The "experts" need to be far more involved in the nitty-gritty of tropical ecology.

D. Basically, we must remember that most of the tropics is "crummy real estate". The cropland available there is so marginal that nobody in his right mind would think of farming it if it were located, say, in Kansas or Ohio.

E. Biotechnology, for all its promised benefits, may create greater problems than we can ever correct. Janzen said that humans have more to fear than to gain from a nitrogen-fixing corn plant. Through such biotechnological breakthroughs, it may be theoretically possible to grow good crops everywhere in the world, and the result -- in the face of rapidly growing global demand for food -- can be a huge expansion of cropland and a correspondingly more rapid and extensive destruction of tropical forests. We should remember, concluded Janzen, that "economic inviability has been the greatest force for conservation in the tropics". It all can disappear rapidly if the entrepreneurs take over the land for commercial food production.

Darrell Piekarz, of the Environmental Interpretation Division of Environment Canada in Ottawa, referred to The National State of the Environment Report for Canada in which he had been directly involved. He described the innovative features used in the report:

A. An ecosystem approach that does not separate biological, physical and chemical processes from socio- economic and institutional activities. The traditional natural resource sectors of fisheries, forestry and agriculture are treated as ecological systems.

B. To structure the data in the report, a stress- response framework was applied to human activities and the environment.

C. Consistent geographic units termed "ecozones" were used as the basis for presenting the data in the report.

Piekarz noted that a number of difficulties have been encountered in obtaining information for state of the environment reports.

Data time series are often interrupted or entirely lacking for key variables; data collected by governments often are meant to serve only narrow regulatory or administrative purposes and cannot be integrated with any confidence with other data; jurisdictions often do not share the same methodologies thus precluding comparability. Speaking generally, governments do not yet have the right data in the appropriate form to provide state of the environment reports with the information that decision makers need.

Commenting on the Canadian agricultural situation, Piekarz referred to a Science Council of Canada report that states: soil deterioration, despite headlines, is not episodic but an ongoing problem; there is no new agricultural land available in Canada. In essence, the long-term viability of Canadian agriculture is being threatened.

William Duchie, Manager of Environmental Programs for Shell Oil of Texas, described his special interests as groundwater and handling of solid wastes. His principal working approach, he said, is to empower people in the field to apply the most positive methods. In his observation, Duchie added, this is often more a matter of changing thought processes than supplying new technology. There has to be a better understanding of the need to balance risks and opportunities, especially in regard to uses of groundwater.

Peter D. Jacobs, Chairman of the IUCN Commission for Environmental Planning at the University of Montreal, recalled that the International Union for the Conservation of Nature and Natural Resources (IUCN) had been formed in 1948, with an original concentration on nature conservancy. By 1978, the first drafts were in circulation for the IUCN report that appeared in 1980 as the World Conservation Strategy, which, Jacobs added, largely introduced the concept of "sustainable development" worldwide.

Following publication of the Strategy, other international study groups had seized on "sustainable development" as a key unifying approach ... among them, the North-South Commission under Willy Brandt in 1978, the World Charter of Na-

ture in 1982, and most recently the World Commission on Environment and Development under Mrs. Gro Harlem Brundtland, the Prime Minister of Norway. All of these initiatives, said Jacobs, were in some measure inspired by the World Conservation Strategy.

An international conference had been held in Ottawa in 1986, he added, to evaluate the World Conservation Strategy with the goal of introducing a stronger element of equity and more emphatic representation of the factor of population growth, as related to factors of peace, environment, and development.

Jacobs concluded his remarks with a personal plea for reintroduction of aesthetics to the dialogue on the global environment, for it is such unquantified human values that often drive our models and shape our concepts of systems management.

Joseph L. Goldman, Technical Director of the International Center for the Solution of Environmental Problems, located in Texas, stressed that -- as a working hypothesis -- he and his colleagues believed that massive environmental problems can be solved only by breaking them down into their more manageable component parts. ICSEP, founded in 1975, grew out of a 1973 NATO conference on technology transfer. It should be perceived as an organization, not an institution; to deal with a given problem, ICSEP would call on the best available sources internationally on a project basis. Its income derives from projects, consulting, and expert testimony. ICSEP has 24 affiliates worldwide, including groups or centers ranging as widely as West Berlin, South Africa, and Stanford.

Calvin DeWitt, Vice Chairman of the North American Conference on Christianity and Ecology, based in Wisconsin, characterized his organization as ecumenical in its purposes and very broad in its scope. Its goal, he explained, is nothing less than to convert every believer into an ecologist. The efforts of NACCE are intended to serve as a model for all faiths around the world.

By personal background, DeWitt added, he is a wetlands scientist at the University of Wisconsin at Madison, with field experience in Indonesia, China, and elsewhere on the preservation of wetlands and wetlands habitats, and wildlife inventories.

The agenda of NACCE includes:

A. Assessment of analyses of global problems, involving a survey of more than 600,000 titles to date.

B. Sponsorship of public forums at the AuSable Institute in Wisconsin on issues of religion and ecology; six have been held so far.

C. Textual review of Jewish and Christian scriptures as they deal with ecology, involving research on documents in Hebrew, Greek, and other languages.

The results of this combined inquiry have been summarized in a series of conclusions as to how to project ecological thinking most effectively within the religious community, in the context of the Assisi Declarations. Both the NACCE and the AuSable Institute conferences, added DeWitt, offer useful international models.

Charles A. Howell, III, President of the Trust for the Future, in Tennessee, commented that he had served for six years previously as the Commissioner of Conservation for the State of Tennessee, and is deeply interested in developing a generic natural resources and environmental strategy for Tennessee. But he is also convinced that no matter how many laws and regulations are passed by political bodies, they will never become truly effective unless the people accept the conservation ethic in their own lives as a guide to their day-to-day behavior. His efforts through the Trust for the Future, he noted, comprise regional forums on the conservation ethic and a variety of other public education programs.

Howell underlined his view that we should not think of our conservation activities as a "gift" to future generations, nor should we think in terms of our "right" to exploit the natural environment to meet current needs. Rather, we should see ourselves as "transient stewards of the rights of future generations," and act with a corresponding sense of personal obligation.

Red Pedersen, Minister of Renewable Resources for the Government of the Northwest Territories of Canada, identified himself as an elected official with a highly unusual and challenging mandate. His portfolio for the Northwest Territories covers not only wildlife, environment, agriculture, fisheries, and forestry but scientific research on related problems. With that span of responsibility, Pedersen added, he has no choice but to take a total view of the environment.

Furthermore, there are a number of special considerations arising from the physical characteristics of his jurisdiction. The Northwest Territories is an Arctic area, located entirely above 60 degrees and extending as far north as 84 degrees Latitude. It comprises fully one-third of Canada's land mass, or roughly the equivalent area of India. The Territories typically has a very short food chain; below the surface of the land, there is permafrost instead of groundwater; and it unequivocally qualifies for Daniel Janzen's definition of "crummy agricultural real estate."

The population of the Northwest Territories is extremely small by comparison to the land mass: only 51,000 persons reside there, and approximately 60 per cent of the population is of Dene or Inuit origin.

Pedersen explained that his special interests could be summarized under these four headings:

- A. Sustainable use of resources,
- B. Integrity of resource management,
- C. Circumpolar cooperation on shared problems,
- D. Designation of special conservation areas.

His view of the issues is practical and down-to-earth, he said. Conservation is best defined as "the minimization of waste of natural resources, and the maximization of future resource options". To be effective, conservation measures must be framed with full participation at regional and local levels. Conservation is not an isolated concern; it is a "powerful source of constant renewal in the mainstream of northern development".

Conservation, Pedersen concluded, should never be dealt with as an academic topic; it must become a political priority. In fact, the level of commitment of public funds to conservation defines the level of priority assigned by the society far more accurately than any public statement.

Roger Sedjo, Director of the Forest Economics and Policy Program for Resources for the Future, in Washington, D.C., suggested that he was perhaps unique among the workshop participants in representing not a conservation or environmental organization, but a policy research organization composed predominantly of economists. His perspective on the issues under discussion, Sedjo noted, is therefore somewhat different from those of others in the workshop.

He believes that the course of social action relies far more on incentive structures than on bodies of law or regulation. And such incentives are by no means inconsistent with the values and ethics of society. For example, Sedjo said, his own field of forestry subsumes some factors that are market commodities for trade (logs, timber), some environmental services for which markets do not truly exist (watershed protection, erosion control), and still other factors such as recreation and amenities that may be either market commodities or be subject to public control.

As an economist, Sedjo explained that he must ask which factors involve ownership and property rights? Which are governed by prices? Since it is hard to own environmental services, a problem arises of skewed incentives, some of which must be dealt with separately through political means. But, in general, too little attention is being given in public discourse to the efficacy of economic and social incentives in the solution of environmental and resource problems.

Richard Gordon, Professor of Agribusiness Management in the Division of Agriculture, Arizona State University, said he looks on the issues of sustainable agriculture as an exercise in the "integrated application of technology". As a biologist with extensive field experience on agricultural problems in both China and the United States, Gordon concurred with Sedjo on the importance of creating incentives and rewards to meet conservation needs.

Commenting on Daniel Janzen's reference to "crummy real estate", Gordon admitted that to most people the deserts do look decidedly "crummy". But they have the potential of becoming "greenhouses without walls" if adequate water can be provided.

Gordon referred to the growing network of local incentives for the small farmer in China, as an example of an attempt to improve the lot of the small farmer and correct the unhappy results of a "mismatch of technology, ideology, and economics" in past Chinese agricultural policies.

Key questions, in his view, are: What has value? How can people pay for it? How shall society measure results? The uses of technology will be guided by the answers given.

Mads Faegteborg, Secretary of the Environmental Commission of the Inuit Circumpolar Conference in Denmark, told the workshop that he is concentrating

on development of an Inuit regional conservation strategy for the Arctic in large part modeled on or inspired by the IUCN World Conservation Strategy. The goal of this Arctic strategy will be to reflect in practical terms the Inuit concept of sustainable yield, blending a transnational system of sustainable wildlife harvest with resource conservation and economic development.

So far, this document is at the draft stage; approaches have been made to relevant international organizations and the framework of approach has been established. The next step will be identification of coordinators throughout the Arctic areas at the local level to help collect information for the database of the system. Faegteborg explained that the goal was to have the strategy in a form suitable for consideration by 1989 in the Inuit Circumpolar Conference.

Nancy Wright, a United Church of Christ minister and an observer representing Wainwright House in Rye, New York, is a Consultant in Earth and Ecological Studies. She explained that the programs at Wainwright House relate to global issues, spirituality, and Jungian psychological analysis. She stressed the need for Christians to correlate the theology of Creation with modern science and to give attention to the psychological and spiritual dimensions of conservation and stewardship.

David B. Porter, Minister of Renewable Resources for the Government of the Yukon, Canada, likened his jurisdiction to The Northwest Territories. The Yukon comprises some 200,000 square miles of the Arctic or near-Arctic region, mainly representing frozen tundra, with only 25,000 to 26,000 permanent inhabitants. As a member of the Inuit Circumpolar Conference, the Yukon stands with its close neighbor across the border, Alaska, in presenting a message of solidarity of the people of the north to the global community on Arctic environmental concerns. Those shared concerns include salmon treaties and negotiations, protection of migratory species (e.g., caribou and snow geese), aboriginal rights, federal ownership of land, and in general the "umbilical cord" that runs from distant territories to the federal government centers of Ottawa and Washington, D.C.

Porter expressed great apprehension about the announced intention of U.S. Interior Secretary Donald Hodel to push for opening rights to oil drilling in the Arctic National Wildlife Refuge in Alaska. Although the actions would be taken within U.S. political jurisdiction, the effects would be felt strongly in the adjacent areas of Canada such as the Yukon. Porter stressed the need for Canadian and U.S. organizations to join forces in opposing oil drilling in the Arctic National Wildlife Refuge, which is, among other things, the calving ground for caribou that migrate throughout the Arctic.

As a guiding principle, Porter asserted that "people who live on the land know as much as the scientist about the management of species and the land". We need to bring them all together -- native peoples, environmentalists, and scientists -- so that they can learn from each other.

Robert Rodale, Chairman of Rodale Press in Pennsylvania, said he was primarily a farmer, and felt very close to the concerns of farmers. His main interest, he noted, is regenerative agriculture, comprising all the practices and techni-

ques required to restore the land and not only maintain but enhance its health and productivity.

Farming, Rodale commented, is a total way of life ... people both live and work on a farm, unlike a factory. In fact, "farming exists in the mind as much as in the land".

Of the remarks he had heard in the workshop, Rodale said he could easily identify with the need to make conservation more economic, the importance of seeing the aesthetic side of conservation, and the vital need for people to participate directly at all levels if conservation programs are to be effective.

Too little attention, he felt, is given to the farmer's state of mind. The farmer's capacities are huge, built on the accumulation of internal resources for 10,000 years. The modern additions to the knowledge of farming are really very new and somewhat superficial. Basically, a farmer knows more than any outsider about what is good for his soil and crops. What farmers need more than anything else now is expert help in regenerating their land. That description of the goal, Rodale insisted, is superior to either conservation or sustainability because it implies making agriculture better and more abundant, not just keeping what we already have.

Finn Lynge is Coordinator of the Environmental Commission of the Inuit Circumpolar Conference in Denmark, which he characterized as a permanent non-governmental organization serving the interests of aboriginal inhabitants (mainly Inuit) of the Arctic areas of Greenland, Canada, and Alaska, as well as regions of the Soviet Union such as the Chukchi Peninsula in Siberia. Taken together, this means the ICC represents an area of some two million square miles and a population of over 100,000 persons. The ICC, said Lynge, is "the only grass-roots, cross-national initiative for a conservation strategy in the world".

Agriculture, in the traditional sense of the word, is not the main interest of the ICC since so little of the area it represents is suitable for farming. But conservation is of foremost importance, especially the challenge of implementing conservation policies in the Arctic where there are manifest differences between the viewpoints of the aboriginal population and the dominant national societies. These differences are growing more striking, if anything, with the advent of closer communications between Arctic communities and the rest of the world.

There are great pressures, Lynge went on, to push the dominant society's values on the Inuit and to turn their native economy into a market system based on cash. Simultaneously, there are coordinated efforts by wildlife protection and animal rights movements to interrupt the traditional Inuit patterns of animal harvests for furs and to destroy their market worldwide.

What is totally ignored by much of the outside world is the fact that the Inuit, without external laws or guidance, have successfully managed their natural surroundings and wildlife on a sustainable-yield basis for hundreds of years. Hunters' councils were formed in Greenland as early as the late 1800s to enforce prudent conservation practices in animal harvests.

In Lyngé's view, the Inuit have several clear and fundamental goals. First, they do not want to have their traditional life style and culture destroyed by outside influences. Second, they want "modern" economic development but on their own terms and with acceptance of their own premises. And third, they want their established patterns of wildlife harvest (for sealskins and other commercially valuable products) respected as a decent, useful, and important part of the Inuit economy, society, and culture in a geographically inhospitable region of the world that affords its indigenous peoples very few other sources of livelihood.

Chief Leon Shenandora, Principal Chief of the Six Iroquois Nations, spoke to the workshop as an invited guest, representing the Native American culture and tradition based on harmony of people with their natural environment.

Chief Shenandora's remarks were highly poetic and impressionistic, filled with allusions to the lore and myths of the Indian peoples, which he felt in many ways prefigure many contemporary environmental problems of our affluent society, such as shortfalls in food production and distribution, air and water pollution, acid precipitation, and conflicts over priorities for economic development.

Most basic of his messages was the warning that, as predicted in Native American traditions, the dominant North American and European societies are blindly "hanging onto something that we know will destroy us". His plea, he said, was very simple: do not destroy the land, water, air, and forests in pursuit of false values. Those who have power must remember, he concluded, that -- as never before -- "the future is in our hands".

Hanne Strong, another visitor to the workshop, described herself as a small-scale farmer in Colorado, totally devoted to natural methods of agriculture, the use of indigenous, non-hybrid seeds (sometimes rescued from small supplies remaining in the hands of Native Americans and other sources for wider repropagation), and avoidance of all chemical fertilizers, insecticides and herbicides. This is also high-altitude farming, Strong noted, with crops including varieties of food grains, oil-seeds, medicinal herbs, and vegetables, all totally organic. She is working, she said, to realize in practical terms the goal of self-sufficiency in small-scale farming, in full harmony with the Earth. The seeds being used come not only from Indian sources in North America but from as far away as the Peruvian Andes.

Benjamin C. Dysart, III, Chairman of the workshop, as well as Past President and Chairman of the Board of the National Wildlife Federation, limited his remarks to one example of an extremely effective working model for environmental assessment: the environmental quality index developed and published by the National Wildlife Federation (NWF). This is now the 19th year of use of the index for the United States.

Its purpose, explained Dysart, is not to influence science or research but to educate nongovernmental groups and the U.S. public at large. The index is simply a kind of measuring stick, now depicted as a scale of progress from year to year (getting better, staying the same, getting worse, etc.) on a series of environmental indicators. Great value is ascribed to assuring the reliability of inputs and professional NWF staff monitoring the consultation of outside experts.

As a device to stimulate public attention and action, said Dysart, the NWF environmental quality index has been very successful. It is used by columnists and others in the communication media, for video spots, and has had a strong multiplier effect going well beyond the roughly 4.5 million members of the National Wildlife Federation.

Only once, in 1972 for the Stockholm Conference on the Human Environment, Dysart explained, did NWF attempt to expand this effort to a world environmental quality index. That experience highlighted the great difficulties of obtaining and aggregating data on a global scale, however, and NWF has kept its focus on the United States ever since.

Karen B. Kress, Vice President for Operations of the National Parks and Conservation Association, noted that the NPCA had been founded in 1919 by Stephen Mather, the first director of the U.S. National Park Service, who even then saw a need for a public watchdog group concerned with the quality and accessibility of parklands. The NPCA is now a very active membership organization with over 60,000 individuals on its roster nationwide. Its activities range from public information and education to research, corporate liaison, and lobbying. The NPCA is directly represented in 250 of the 337 U.S. Park Service units and many state parks. The NPCA National Park Trust carries out a land acquisition program focused on the sizable amounts of privately owned lands within national parks. In addition, the NPCA disseminates books -- for example, on the green-line park concept -- and does some work internationally in encouraging more widespread citizen understanding of the importance of parks, and support for park programs, in other countries.

Margarita de Botero, formerly the Director General of the Institute for the Environment and Natural Resources of Colombia, and most recently a member of the World Commission on Environment and Development under United Nations sponsorship, joined in the workshop discussion briefly as a visitor. She reported on the project she had initiated for the creation of Green Councils in Colombia to encourage direct citizen participation in the resolution of environmental issues.

De Botero first expressed her strong personal concern for broader public knowledge, commitment, and support on environmental issues in the societies of the South, where all too often the supposed imperatives of environmental protection and conservation are in conflict with the day-to-day survival needs of individuals. The development models offered by the North, she said, are unsustainable; they are far beyond the ecological means of the South, which desperately needs new models and patterns of its own. A whole new order -- based on different values, greater equity, better access to information and communications, and a more democratic political system -- must emerge.

There are many experiments under way in the South, she stated, but they are little known. People need to understand that "there is wealth in their hands ... they can take control of their own destiny". Who can set the value of the loss of one hectare of tropical forest? The role of the Multilateral Development Banks in this regard, de Botero added, has been deleterious; the World Bank is about to

destroy another 70,000 hectares of tropical forest through its misguided lending policies.

Meanwhile, as ecological disasters of such global magnitude proceed, the incomprehension of the leaders of the governments of the North is demonstrated in the continued diversion of immense wealth, resources, and scientific talent to the expansion of armaments.

In Colombia, de Botero explained, she had decided to work on these problems at a different level: through the mayors of each major population center. Since NGOs in Colombia have no money or support, every mayor in Colombia was asked to organize a Green Council to provide the foundation for a national dialogue on the environment. In only eight months 850 such councils were organized and over 750,000 informational booklets were published, introducing the concept of conservation through citizen power.

The Green Councils undertook inventories of resources, "a kind of map of local wealth", and studied the factors determining the development, using a Manual of Natural Resources for Mayors. The latter gave guidance in simple terms on techniques of control, regulation, imposition of environmental penalties and fines, etc. The Green Councils also encouraged journalists to highlight "success stories" of environmental progress.

In the more recent past after she had left office through a change in government, de Botero reported, the Green Council movement had, unfortunately, faltered. Many mayors and city council members had been resistant to the formation of the Green Councils because they represented a new political power base in their communities, threatening to the established order. Without dynamic leadership and pressure from the top, such local opposition usually won out over the newly-created Green Councils.

Now de Botero explained, she was devoting most of her time to a closely related educational approach -- Green Universities -- to prepare people for effective involvement in decision-making on conservation and the environment. This is an effort that she hopes will appear less directly challenging to the status quo in Colombia. But basically, de Botero concluded, she sees no alternative to "turning political power around" in favor of policies and programs that are "less selfish, more generous, more wise, and more responsible" in terms of development and environmental protection.

IV. Highlights of General Discussion.

The ensuing general discussion in the workshop ranged far and wide over portions of two days, within the basic outline indicated above in Section II, and cannot be presented here in detail. Some of the highlights were:

- Part of the challenge is to feed the hungry of the world while we change the system; we must therefore think of policies for managing the transition (Dysart and others).

- Within the general thrust of recommended actions, we must be prepared to accept differing economic models, cultural diversity, and pluralism. There is no single, universally applicable solution (Jacobs).

- While the Colombian experience with Green Councils demonstrates the remarkable ability of one dynamic and devoted individual to effect change throughout a society, it also proves that major social/political innovations imposed from the top down, rather than the bottom up, are unlikely to outlast their sponsors (several).

- Science does not exist as an abstraction; science also is a social system driven by human desires, ambitions, and other forces (Jacobs).

- Let's recognize that humanity has already won the battle with nature; in fact, we've beaten the hell out of it. Now it's time to look back at what we want to save (Janzen).

- It sounds like we still are trying to save the world at the expense of Third World people; what we really need to do is to share the costs and provide economic incentives to people to save the world themselves (Duchie).

- We need to recognize the importance of myths and old memories in our cultures; and we need to create some new myths and memories to fit changed circumstances (Howell).

- Regeneration is nothing but conservation after the fact. That's what we need to avoid; let's choose policies and practices to keep us from making the mistakes in the first place (Pedersen).

- What is "wise use"? By whose definition? There can be many kinds of equilibrium in a sustainable system (Janzen).

- Let us recall that experts do differ. Science is not unanimous in defining sustainable yields. But there will always be an appropriate role for science and technological management in the solutions we recommend (Dysart).

- Don't forget that traditional practices and methods are also forms of technology (DeWitt).

V. Consensus Statements.

Assignments of drafting groups were made by the Chairman and the statements that emerged from further rounds of discussion and criticism are presented below. Time pressures at the close of the workshop prevented detailed approval of each draft, but it was the consensus of the group that these written statements should represent the conclusions of Workshop III.

A. Philosophy and Ethics (VISIONS).

We believe that conservation is simply a minimization of waste of natural resources and a maximization of future resource options. It follows that -- in order to maintain, rehabilitate, and promote sustainable systems for the provision of food, fiber, and habitat for all creatures of this "only one earth" in perpetuity -- all

individuals and institutions must seek to eliminate alienation from the land caused by

- environmentally impoverished urban settings;
- environmental degradation;
- destruction of habitat;
- extinction of species; or
- failure to recognize the intrinsic value of the land, viewing the earth's ecosystems only as an inexhaustible source of commodities.

We pledge our highest and best efforts in this undertaking, not only for the benefit of ourselves and our immediate neighbors, but because we recognize and respect the basic imperative of equity and conservation of human options for the benefit of neighbors around the world, and neighbors we will never know across the millenia.

Through caring, inspired stewardship, we will move toward a willed future of sustainable development. To this end, each individual and institution must be empowered to share in this stewardship, which will honor the aesthetics and integrity of creation, the wise use of natural resources, and the interconnectedness of the web of life.

B. Issues and Questions (POLICIES).

1. Human and Cultural Degradation.

Related to the degradation experienced in the biosphere is the degradation of long-standing traditional, and even modern, cultures. Under the influence of spreading global economies, many cultures have been compelled to abandon past practices with a concomitant diminishing of sustainable use of land and food resources. The few remaining traditional cultures are fast disappearing as modern economies expand into the remotest reaches of the planet. With these cultural losses also follow loss of the heritage of information on human uses of native plants and animals for food, fiber, and medicine.

Many of the world's severest environmental problems are a consequence of extreme poverty: deprived people are forced to undermine the productivity of the land as they press outward to find food and fuel. Rural people with no other choice increasingly plant crops on poor, erodible soils, graze their stock on marginal land that in time desertifies, and cut trees needed to stabilize soils and water supplies.

More and more, the poor are limited in their access to the resources needed for earning a living. Growing poverty strengthens the incentive to migrate to cities and to other nations, thereby expanding the problem to larger, often global, dimensions, affecting both the poor and the prosperous. Beyond this, the dependence of prosperous nations upon natural resource commodities from all over the world and the international flows of capital, technology, and entrepreneurial effort, make the problem of world poverty a global one that threatens the integrity of environment and social institutions everywhere.

Our hope is for the restoration and continuation of a self-sustaining planet. It is a hope for a self-sustaining house; an oikos where brokenness and decay are replaced with ecological wholeness, health, and life. It is a hope for what can and must be: a sustainable Earth.

To realize this hope, all must become aware, gain knowledge, and develop respect for the creation's self-sustaining systems that make all life, including human life, possible.

To reverse the trend of the past decades and centuries toward alienation and degradation, each institution and each individual must work to open "windows on a creation regained" -- idealized gardens of the mind and realized gardens on Earth.

2. Respect for Traditional Practices.

Nature conservation and management practices should take into account not only attitudes and policies developed in academia and higher levels of administration, but grassroots traditional attitudes as well. Much accumulated, nonformalized wisdom is to be found among the actual users of the natural environment, especially among Fourth World population groups (defined as the indigenous peoples of the world who, living on the land of their ancestors and upholding their traditional values, are dominated by subsequent technologically and numerically stronger nations). Fauna, fowl and fish, lands, wetlands, rivers, and other bodies of water already in use and already being managed in various ways should be subjected to new conservation measures by the dominant society only in collaboration with those living on the land, and with respect for the traditional management practices already developed by them.

3. Harvests of Wildlife.

Primordial human lifestyles, in which daily food is taken directly from the surrounding wild vegetation and wildlife, are still observed in important areas of all five continents. Stocks of fish, fowl, and fauna in the wild, harvested on a sustainable-yield basis, represent valuable and often indispensable food resources for numerous population groups around the world who, in many ways, have been dispossessed of formal title to their ancestral lands.

This tradition of food procurement, which is basic to the livelihood of these peoples, is being threatened in several ways: (a) habitat destruction; (b) unfairly restrictive legislation; (c) erosion of traditional conservation practices; and (d) destruction of markets for the products of these groups.

In cases where traditional food procurement from the wild is being obstructed or eliminated, the need for nutritional replacement values is seldom taken into account. The result is frequently malnutrition and unnecessary associated health problems among the indigenous peoples.

Development projects and legislation touching upon indigenous hunting and fishing rights should be planned and implemented in close consultation with the local populations, in a manner that will not adversely affect their food procurement opportunities.

Dominant societies should accept the responsibility of securing, through appropriate legislative measures, a market for products originating from aboriginal subsistence economies.

4. Military Installations.

The presence and build-up of military installations often negatively affect the environment and quality of life of surrounding civilian settlements. As a general position, recognizing the need for appropriate provisions for national defense, plans for any military installations should ensure that the local civilian population will not be forced to bear an undue burden of the costs of defense in terms of exclusion from the use of traditional lands and destruction of critically important ecosystems.

5. Foreign Aid and International Debt.

It is now clear that developing nations are unlikely to be able to repay the ruinous debts incurred over the past decades. Redeployment of assets that otherwise would be used for debt reduction, as well as debt forgiveness itself, should be coupled with new investment in specifically designated projects for agricultural and environmental regeneration suitable to the local setting. More generally, foreign assistance to help increase sustainable food production and restore the ecosphere should be carefully targeted and scaled down to levels appropriate to local needs, rather than continuing support for a few massive government-to-government projects.

6. Levels of Technological Input.

As the world emerges from an era predominantly concerned with intensive agricultural production, it has become clear that profit to and fulfillment for future farmers will involve increased tailoring of production to fit specific end-uses at the lowest possible systems cost. As a guideline, it should be remembered that the lowest production level of input using appropriate technology is more likely to result in sustainable food production over the long term than a high-input, high-technology approach oriented toward quick results.

7. Biotechnology.

As applications of biotechnology begin to have a greater impact on agriculture, it becomes apparent that genetic engineering could produce a virtually unlimited number of new varieties of plants tailored to flourish under a broad array of sustained-yield agricultural conditions.

The means employed to develop such new varieties (e.g., gene insertion via splicing, commensal viruses, etc.) should be subject to social control if there is a finite chance that (a) the modified species can survive independently of human control; (b) the new species may replace the parent species; or (c) that the means employed to obtain the desired characteristics could move beyond the area of proposed application.

While development of appropriate biotechnology should be encouraged, realistic prior assessment of the probable impacts on the ecosphere will be mandatory, and the entire process must be subject to social monitoring and control.

8. Regenerative Approaches.

To achieve the combined goals of high and sustainable yields and ecologically benign effects, there must be integrated policies for agriculture and land management, ensuring that each crop planted and harvested improves the soil, water, or other growing environment in which it was produced. Regeneration should be the preferred approach to sustaining and improving any particular cropping or production system over time.

9. Driving Forces.

The factors that cause individuals and communities to choose sustainable-yield agriculture must be clearly identified. People obviously respond with greatest energy and determination when incentives are built into a system so that the participants clearly see that they will obtain rewards as a result of optimizing desired behavior. In the case of sustained-yield agriculture and integrated farming and land stewardship, it is crucial that those charged with responsibility for sustaining habitat be able to calculate the rewards of carrying out the desired policies. It is of utmost importance that all participants share in planning and evaluating the desired programs so that internal driving forces replace passive acquiescence to externally imposed programs.

10. Urbanization.

Unlike migrating herds of animals, concentrations of human populations become fixed in urban centers, shifting the political balance and preempting resources required for food and fiber production and maintenance of habitat.

As urban areas grow and distances from the sources of food increase, new patterns of trade and transport create a complicated infrastructure focused on service to metropolitan areas rather than on sustaining agriculture or regenerating the environment. The resultant strains and alienation between urban and rural populations must always be addressed in developing long-term approaches to integrated land management and sustainable agricultural production.

II. Prioritization.

A key to resolving differences over alternative approaches to integrating sustained-yield agriculture with long-term land management is the establishment of a process of setting priorities that is open to participation by all. Prioritization should involve the entire community in establishing objectives, selecting the means to obtain those objectives, and considering the various elements of fulfillment, reward, and risk associated with a particular course of action.

Experience in locations as different in culture, society, and geography as China, Mexico, and India makes clear that success in initiating agricultural programs from which the benefits will accrue over time requires the broadest possible local participation, to create an individual sense of "ownership" of the plan.

C. Institutions and Strategies (ACTIONS).

1. Ensure the direct participation of citizens in the design and development of their communities, and in the basic systems that govern their lives.

2. Establish institutions and mechanisms to encourage the interchange of appropriate technologies and traditional practices.

3. Plan agricultural systems to ensure that food production is first applied to meeting local consumption needs. Commodity production for export to help balance a nation's debts must not be permitted to outweigh the requirement to meet internal demand. World Bank and other foreign assistance projects should carefully acknowledge this priority.

4. Implement fiscal programs that are consistent with the goal of sustainable agricultural production, and incorporate clear incentives for citizen participation and support.

5. Integrate environmental values and the conservation ethic into all forms of education and all educational institutions.

D. Case Studies Suggested.

At the close of Workshop III, several participants indicated that they would provide specifics of case studies relevant to the theme of sustainable agricultural ecology. These included:

1. Janzen/Costa Rica: An Alternative Environment.

2. Gordon/Cassava Production in Latin America: Competing National Priorities vs. Support of Small Farms.

3. Gordon/Plantation vs. Wild Harvest of Jojoba.

4. Porter/Porcupine Caribou Herd Management Agreement, involving Government of Canada, aboriginal user-groups, Government of Northwest Territories, and Government of Yukon.

5. Porter/Alaska Whaling Commission, consisting of Inuit whaling villages for advice to International Whaling Commission on management issues.

6. Faegteborg/Military Base Disruption of Local Environments.

WORKSHOP IV:

HUMAN SETTLEMENTS: FACTORS AFFECTING THE QUALITY OF LIFE

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CHAIRMAN'S INTRODUCTION

Jorge E. Hardoy

I would like to toss around some of the key ideas which I believe we should follow in our discussions. I strongly believe that the main force giving shape to the physical form of cities is poverty. Poverty is the dominant force in the spacial distribution of populations within Third World countries. We are all aware of the many faces of poverty, but we are simply not aware of how poverty influences cities in different degrees.

And what really worries me is that the nations of the third world and also the world communities and agencies seem lost in the brutal reality that they neither want to nor know how to face. Some governments do discuss these issues, but there are many things which could be initiated and this is the whole thrust of the short paper I prepared.

Frequently, the political unrest in Third World countries is less challenged and less threatened by environmental crisis than by a social crisis which is clearly there for everyone to see. This social crisis in Third World countries is largely rooted in the selfishness that pervades in human relations in Third World countries. I think then, that if you can agree on this very short and broad diagnosis, the key urban challenge is the growing gap between available resources and the needs for the construction, upkeep and management of settlements of all kinds. It is in this point that we should make a very strong effort.

IID has recently helped to put together in Nairobi the first ever NGO meeting, with the participation of 45 NGOs from Africa, Asia, Latin America, plus a good number from the industrialist world. It is a key group that has a view of cities and settlements all over the third world. This is quite different from the views presented by the governments, which usually are the views that the U.N. has to present in their statistics, for they have no other sources of information.

But at the root of many rural and urban problems is the decentralization of power. The political machineries of many governments and agencies seem at times unable to approach problems vertically. Many governments and agencies claim that they are the centralizing power in activities and investments, when what we witness is a decentralization of consensus. Centralization is persistent. Not even the more democratic and progressive governments in the third world share power willingly. For example, in my home, Argentina, and in Mr. Cavalcanti's home, Brazil, we have moved from rather brutal regimes to democratic governments. I think he will agree with me when I say that we are strong in decentralizing consensus, but we are very poor in decentralizing power, legitimacy, resources, etc. This perhaps explains why explicit policies for regional decentralization have not satisfied the expectations of the governments who announced them.

I also think that centralization explains a tendency to universalize the problems of third world cities. One who has been in the trade for 30 years

develops a certain sense that what is good for the city of Salta with 250,000 Saltan inhabitants in northwestern Argentina has nothing to do with the problems of Cochabamba in Bolivia 800 kilometers away. Each case is unique and requires certain individual approaches.

The other point is that the generalized official approach of government is to provide the landless peasant, the small rural land holder, the urban quarters of the slum dwellers with "ideas." By ideas I mean those small- scale, isolated and official initiatives that governments frequently launch with the hope that they will be replicated, although governments have not a clear idea who is going to replicate them. How sure are government officials that the social groups who are supposed to benefit from these ideas do not have their own ideas for stopping the gradual decline that is pushing them down from subsistence to crisis level? These are some of the questions that come to my mind constantly.

I think that what I would like the workshop to do is to put a thrust on creating and making available more resources for the construction of cities. What are these resources and how do we allocate them in order to build cities and settlements of all types, which help development while providing basic standards for all. I think that this is the challenge that we have to face in this workshop.

SUMMARY REPORT

C. Eric Carlson

The Stockholm Conference in 1972 gave human settlements a great deal of attention on its agenda. The phrase, "poverty is pollution" became bandied in the discussion of what to do about human settlements issues. Subsequently, the UNEP governing council was very serious about taking action to improve the general human settlements conditions around the world. It created an international financial facility, it urged the convening of the Vancouver Habitat Conference in 1976, and it was very energetic in trying to move forward in this field.

The tenth commemorative session of the UN Commission on Human Settlements, held in Nairobi last April, showed us that a great deal remains to be done. Some governments reported progress on the international year of shelter for the homeless, but when all contributions from all governments were summed up for future work in this field, the sum was a rather modest one, considerably less than \$5 million.

One third of the world's people are impoverished: they suffer from poor health, inadequate diets, inadequate income, inadequate housing and living conditions. Their housing conditions and access to basic services such as water, sanitation and health care have improved little if at all in the last 40 years. Poverty is giving shape to the physical form of most of the world's cities. Both governments and international agencies are failing in their duties and responsibilities. The result is an enormous toll on human health and well-being, affecting hundreds of millions of people.

Yet it is low-income people who are responsible for the planning and construction of most new housing. In doing so, they contribute much to capital formation and they create economic activities (such as employment) through their demand for materials, fixtures, fittings, etc. With the right kind of support and advice, they can solve their own shelter problems. But governments often deem illegal most of the houses they build, and discourage or repress the community-based organizations they form. Rather than ignoring or actively discouraging the process by which people build and improve their homes and neighborhoods, governments and international agencies should support, enable, and empower them.

The task before us is to change the processes by which cities are built so as to help their inhabitants earn more adequate incomes and promote community participation, which is the root of participatory democracy. How can cities, towns and villages be built to facilitate social exchange, to insure basic services and adequate accommodation available to all -- which can be built, maintained, and managed within the resources available to each national society? This was the general framework of our discussion.

We reviewed the questions of resources to overcome these growing gaps within the human settlements field. We found that there are a lot of unused or underutilized resources, and there are new resources that have to be found and made available to these community action developments. There is a great possibility of avoiding waste through better administration. Problems include: inadequate administrative processes; corruption; and inadequate training, salaries and equipment. There must be carefully targeted development and control of institutions which will have a great impact in this whole field.

Another aspect of increasing the effectiveness of resource use is that of assessing the use of resources for the poor. It is important now, because the policy of targeting for the poor has literally come and gone from the agenda of the international agencies since the time of the Stockholm Conference in 1972. The current emphasis is on sector-wide and broad institutional solutions that do not directly affect the poor. To assure the essential effectiveness of these actions, there needs to be some very careful evaluation of the situation.

There is a great deal that can be done to improve the financing of local and city governments, which have such great responsibilities for dealing with the planning, management, and construction of human settlements. Many Third World countries have very low real estate taxes; indeed, a number of public agencies and nonprofit institutions pay nothing to these local governments.

There is much vacant land and many urban buildings owned by different public agencies, and Third World countries generally do not have a flexible mechanism to allow the transfer of these lands and buildings to agencies involved in housing, health, education, services and promotion. We must give encouragement to low-income community organizations which have shown great courage in the face of enormous odds in undertaking the construction of their own habitats.

There are, of course, savings that remain to be mobilized, especially in the informal sector of urban economies. There are funds of foreign corporations often blocked in Third World countries. Perhaps it would be worthwhile to create new incentives for Third World depositors in foreign bank accounts to repatriate part of the funds they send abroad, often illegally.

We had a lot of discussion about the interaction between governmental and nongovernmental organizations. There was a lot of discussion about the need for new kinds of training at the local government level, for both community development activities and for improving the technical know-how and capacities of people who deal with such a wide range of problems at local government levels.

This is the International Year for Shelter and shelter is increasingly being recognized as a human right. Somehow the international perception and support of this sector remains very inadequate. It has certainly become apparent that global action to resolve these problems is not successfully stimulated by rhetoric and statistics and discussion, as has been done in these past 15 years of relatively little improvement since the Stockholm Conference.

The African drought demonstrated that world relief action is more effectively stimulated by first developing people's concern through a direct appeal to the

heart, a powerful appeal which touches people in a profoundly personal way and that can then move them to reach out and help because they can do nothing less. In the years to come, this global conscience must be further developed through the wise use of the media to stimulate feelings of concern and custodianship, out of which constructive action will come.

In addition, we don't yet understand how cities can be built to provide all their inhabitants with adequate services and living standards at a reasonable cost to society. We need to plan and establish methods of development which are practical and efficient, yet which city governments can afford to finance and manage. We have a very simplistic and often inaccurate division of the world into rural and urban areas which really hinders effective public management and the provision of services. We must rethink the whole Third World city.

We, national and municipal governments, international agencies, community leaders, researchers, NGOs and professionals, must find new ways to address the twin problems of poverty and environmental degradation. We must rethink the division of tasks, resources, and responsibilities between us, and we must do so immediately to address the most pressing needs of low income people who live in constant need of secure shelter, basic services, and adequate incomes. This is truly a "one earth" challenge.

RAPPORTEUR'S REPORT

C. Eric Carlson

I. Major Issues and Conclusions

For about one-third of the world's people life is one of poverty, poor health, inadequate diets, low income and unsuitable housing and living conditions. Their housing and access to basic services such as water, sanitation and health care have improved little or not at all in the last 40 years.

Poverty is giving shape to the physical form of most of the world's cities. Both governments and international agencies are failing in their duties and responsibilities. The result is an enormous toll on human health and well being affecting hundreds of millions of people.

Yet it is low income people who are responsible for the planning and construction of most new housing. In doing so they contribute much to capital formation. They create employment and economic activities through their demand for materials, fixtures, fittings, infrastructure and community facilities. The informal sector in squatter areas and marginal settlements provides essential labor and services for the functioning and expansion of the urban economy generally. Because access to urban land is not readily available, the informal sector is often limited in choice to occupying ugly and insalubrious sites but with their labor, however, they can improve their environmental surroundings. With the right kinds of support and advice these people can and are solving their own shelter problems.

But governments often deem illegal most of the houses they build and discourage or repress the community-based organizations they form. Rather than ignoring or actively discouraging the process by which people build and improve their houses and neighborhoods, governments and international agencies should support, enable and empower them. The task before us is how we can change the processes by which cities are built so as to help their inhabitants generate more adequate incomes and promote community participation. How can we build cities, towns, and villages that facilitate social interchange, that ensure that basic services and adequate accommodation are available to all, and that can be built, maintained and managed within the resources available to each national society?

All Third World nations face a common urban challenge. This is the growing gap between the resources needed for the construction, maintenance and management of human settlements and the actual availability of these resources. The problem is accentuated by the international debts hanging over so many countries resulting in a further constriction of resources for development and for human settlements in particular. Under-used resources must be identified and new resources must be found and made available.

Waste must be avoided by improving management and administration. This includes curbing the corruption that consumes a large portion of the financial resources made available for development. It includes reform of bureaucratic

processes that result in budgetary uncertainty, poor project preparation, and excessive delay in implementation. It calls for special attention to providing appropriate levels of training, salaries and equipment for public servants. It also requires carefully targeted measures for control and institutional development in which improved management concepts and performance can prosper.

How and whether international resources are used for the poor must now also be re-assessed. This is especially important because the policy of "targeting the poor" has literally come and gone from the agenda of the international agencies since the time of the Stockholm Conference of 1972. In the ensuing decade the World Bank developed certain policy and operational concepts aimed at benefiting poor populations, a particular example being the "sites and services" that were promoted in many countries with much vigor and input of resources. These have now disappeared from the horizon (because of the difficulties encountered) and there has been little replicability of these projects. The current emphasis is on sector-wide and broad institutional solutions that do not directly affect the poor. In fact, the Bank's new reorganization appears to specifically downgrade future planning and concern with the urban sector and water supply. Formerly this area had departmental status, but it is now being reduced to that of a small division within an Infrastructure Department. The point has been made that it will now be considerably more difficult to evaluate the essential effectiveness of these and other actions in dealing with the poor. Yet such evaluation is indispensable, if only to dispel the illusions that the existing financial institutional structure for development is likely to provide any significant volume of resources or assistance for human settlements improvement.

At the national level urban and municipal finance systems are candidates for major reforms to increase the availability of resources for development, infrastructure, services and facilities. At present, real estate taxes are not the revenue producers that they should be -- they are too low, as are collectability ratios. This situation is further aggravated by the number of public agencies and non-profit institutions that pay no taxes at all.

Resource enhancement for urban improvement is also handicapped in many countries by the chaotic situation of controls with respect to the stock of buildings and urban lands owned by different public agencies and untaxed institutions. Many countries have no flexible mechanisms to permit the transfer of these lands and buildings to the agencies that need these resources for housing, health, education, community services or industrial promotion. Land is a fundamental resource and should be used effectively through planning acquisition and development techniques and instruments established at the local level.

Better use of human resources must be considered in urban strategies. This is exemplified by the courage that low income community organizations have shown in the face of enormous odds in undertaking the construction of their own habitats. They have become the true planners, builders and even the administrators of a substantial part of many Third World cities, towns and villages. Facilitating these processes is perhaps the most important social investment that Third World governments could undertake, and should be aided by the international com-

munity. The challenge to governments, voluntary organizations and international and multilateral agencies is how to remove the various legal, economic and political obstacles they face, secure their effective integrated participation in policy making and provide them with the necessary legal, economic and physical resources and support. Only in this way can current trends be reversed and realistic contribution be made to these forces and energies shaping the urban environment.

Concerted efforts for mobilizing household savings will remain as a fundamental element in all programs for housing and community improvement. Enlisting the informal sector in such savings programs can be an important step forward. Governments can assist by providing incentives, insurance and guarantees. People's cooperatives, credit unions, mutual organizations and building societies, savings and housing corporations and savings banks can all participate in this process if properly established and supervised.

It can be expected that women will have an especially important role to play, as community management and economics are closely related to household finance and home economics. As so many women are heads of households in developing countries their insights, resources and participation must form an essential part of all levels of planning, organization, building and management of human settlements.

Although there has been a massive flight of capital from many developing countries, new efforts must be made for repatriation and reinvestment of such funds sent abroad -- often illegally -- by wealthy Third World individuals for deposit in foreign bank accounts. This can be an important additive to new financing possibilities in connection with human settlements. The blocked funds of foreign corporations in many Third World countries also offer possibilities for resource mobilization and investment. Debt repayment strategies may also involve the accumulation of local currencies that could be devoted to financing and investment in building industry enterprises either through equity participation or mortgage securities. Similarly, local counterpart currencies resulting from international aid programs can perhaps be mobilized for investment in human settlements. Multilateral corporations have the potential to play an important role in some of these efforts.

How external aid resources are actually applied can be a most important factor in extending the range of their benefits. The Urban Challenge chapter of the WCED report provides an example of "Three Ways to Use \$20 Million to Improve Conditions in a City of 1 Million." This shows that directing external funds through a concept of community-based organizations can vastly multiply and maximize basic improvements in human settlements for large sectors of the population. A somewhat comparable approach has been developed in several countries, of making small grants or loans through credit unions, who then increase their capacities for making loans for housing improvement and related purposes. It is also part of an institution-building process.

Several countries have established special instrumentalities to promote and accelerate these processes. FUNACOMUN, the Foundation for Community Development and Municipal Improvement, established in Venezuela in 1961, was

an early model of this type of approach. Although the UN Habitat and Human Settlements Foundation did not survive as an international entity, Habitat Foundations were established at the national level in several countries to work more closely with NGOs, community based organizations, municipalities and the private sector. Mexico's FONHAPO, the Foundation for Low Cost Housing, has achieved remarkable results and progress by promoting and working with municipalities, people's organizations, cooperatives, housing associations, etc., in all parts of the country. FONHAPO was also the recipient of a large World Bank loan that enabled it to expand its operations.

The People's Republic of China, a country of 1.065 billion people with per capita income of less than \$300 annually, has demonstrated that national organization for housing and development can mobilize huge resources, even in poor countries. In the past several years China has been building more than 13 million dwelling units annually at one of the world's highest construction rates --16 units per thousand in urban areas and 11 per thousand in the "rural" areas where the bulk of population is still located. China is devoting 8.35% of its Gross National Product to this sector, which demonstrates the national will and purposes involved.

The governments of most developing countries have a long tradition of centralized control and, as a consequence, the development of strong and effective local governments has lagged. A great effort must be made to advance their management skills and also to improve their revenue generation capacities. They must have taxing authority and an adequate tax base to provide and maintain the infrastructure, services and facilities which their populations require. The process of decentralization of government must be facilitated by leadership and support for local institution building from national and international agencies. Otherwise, they will not be able to overcome their present, great, financial, technological and managerial obstacles.

New and creative local government management training programs should be established where none exist, and strengthened and supported where such do exist. These programs should improve managerial skills, technology and ability at all levels, but particularly the "hands-on" knowledge of local communities. The present-day management of cities cannot ignore the experience of the local communities involved in building, working in and creating a functioning city. This poses an educational challenge in that it breaks through established disciplinary, sectoral and professional barriers. Efforts should also be made to provide local communities and governments with access to state of the art technology in information systems, management techniques, and property taxation systems. The "twinning" of cities and towns within countries and between countries is an important technique for training and interchange of information and practices. Universities and other permanent institutions of learning and training have an important responsibility to establish and reinforce centers or institutes of public administration. These will include strong components for urban management training and related research on local government and public authorities.

In this International Year of Shelter for the Homeless, the concept of shelter as a human right (as stated in the Charter of the United Nations) is becoming

increasingly recognized. The inhabitants of illegal or marginalized settlements will therefore have access to legal instruments and processes not formerly available to them. The newly legalized settlements will also offer opportunities for mobilizing additional resources and integration of existing, informal sector activities into the economic mainstream of the larger community or urban setting. There will be a need for a network of cadres, trainers and animators at the community level to implement projects and to work with local government officials in their application of technical skills and management for community development. The web of interactions among local institutions for commerce, municipal business, training and information exchange will strengthen the community's identity and highlight the role of local government as implementor. Central government may simultaneously shift into the primary role as facilitator.

In recent years there have been dramatic examples of the mobilization of external assistance for emergencies in both developed and developing countries. There are many lessons to be learned and effective media strategy should be organized for such efforts. But it should be remembered that the poor live in a state of constant emergency in many countries, especially with respect to their shelter, housing and human settlements environments. It is time to begin treating human settlements as a continuing problem requiring new political understanding, new strategies and specific projects. It also calls for the generation of a global conscience with respect to these problems.

As evidenced in the past fifteen years of little improvement in the human settlements situation, rhetoric, statistics and discussion have not stimulated the global action needed to resolve the problems. The African drought demonstrated that world relief action is more effectively stimulated by first developing people's concern through a direct appeal to the heart, a powerful appeal which touches people in a profoundly personal way, which then moves them to reach out and help because they can do nothing less. In the years ahead this global conscience can be further developed through the wise use of the media to stimulate feelings of concern and custodianship out of which constructive actions will then come.

We still do not know how cities can be built to provide adequate services and living standards at a cost which city governments can afford to finance and manage. But we do know that they should provide improved quality of life and better access to livelihoods for many impoverished residents. There must be a rethinking of the nature of cities in developing countries. As the urban population of the Third World becomes a major part of the total population of our Only One Earth, so international and national investment must be increasingly directed to urban areas. There can be no further temporal lags in this respect as urbanization has for too long been neglected as a focus of concern.

Our simplistic and often inaccurate division of the world into "urban" and "rural" areas hinders effective public management and the provision of services. The reality is that new forms of pervasive urbanization and ruralization are becoming established in major regions of the world, creating new and rich mixtures of people's activities and movements; and production of both industrial and agricultural products. Norms and standards for building, planning and infrastructure can-

not be arbitrarily imposed but must obviously be carefully tailored and adapted to the situations in each regional setting.

In conclusion, we must rethink the Third World city. We -- national and municipal governments, international agencies, community leaders, researchers, NGOs, professionals -- must think of new ways to address the twin problems of poverty and environmental degradation. We must rethink the division of tasks, resources and responsibilities between us. But we must do so immediately with a view to starting action now to address the most pressing needs of low income people for secure shelter with basic services and adequate incomes.

The challenge of building and managing livable and sustainable cities is a learning process for North and South, East and West. Human settlements must become a prime focus of concern and action as they were meant to be at both the Stockholm and Vancouver Conferences. The alternative is a hopelessly divided planet in which the concept of livable and sustainable cities will seem ever more remote. This is truly the challenge for this Only One Earth Forum.

II. Highlights from the Dialogue and the Background Papers

The conditions of the urban crisis and its worsening effects were underscored by Workshop IV participants and further substantiated in the documents made available.

Aina described how Africa's current crisis affects human life and conditions in African cities and referred to the need "to urgently take the strain off" not only the existing cities of Africa but the whole continent and its peoples. He pointed to "the persistent and dramatic deepening since 1973 of what first appeared as a purely economic malaise but which over the years had taken on painful and costly dimensions expressed in a series of ecological, political, social and health upheavals with every recurrence." The peculiarity of the African experience is the long-term nature of the threatened breakdown and its lack of resolution in either one direction or the other.

The situation in SubSaharan Africa is that of worsening or stagnating economic conditions evident in high inflation, increasing unemployment, declining incomes and deteriorating productive capacity. The "stabilization" and "structural adjustment programs" to promote economic recovery are having a decisively anti-urban and monetarist focus, with serious implications for the conditions and future of services, infrastructure and welfare among the urban poor in the poor countries of Africa. Many African cities can now be characterized as centers of refuge and arenas of survival.

The facts would seem to call for pessimism, but there are solutions and attainable options, at both domestic and international levels, that can be brought to bear within a context of domestic self-reliance, creativity and adaptation. For Shelter, Services and the Environment, people must be given access to land, financing, skills and building materials, and attitudes toward them must change from that of

"contravention" -- punishment for "illegality" and demolitions -- to that of legitimization, support and upgrading.

Contemporary African governments and politics are burdened by the current crisis and solutions must come through the efforts of the people and their communities with the support and active encouragement of the governments. It is in this context that African governments are under immense pressure to move away from the authoritarian, centralized, personal rule characteristic of current politics. There must be a minimum of representation and participation in decision-making, at least at the local level. Participatory planning will help to ensure that urban growth and urban development is based on a rational, orderly pattern that combines the emergence of settlements with the provision of minimal basic services and infrastructure of appropriate standard.

The international community has a basic obligation to help resolve Africa's endemic conflicts and wars, to seriously review and seek a solution to Africa's debt crisis so as to mitigate its worst impact on the most vulnerable groups in the cities, and to reexamine the nature and character of development aid.

Smith described the misconceptions regarding the International Year of Shelter for the Homeless. He pointed out that it is meant to be a "framework for mobilizing resources of all participants in the shelter sector to bring about visible housing improvements for the majority of people in the world today." Further, it is essential that we tap the resources of all those in the public, private, informal and community-based sectors who can contribute to the goal of solving the shelter crisis by the year 2000.

The real problem is that despite our "global village," issues of shelter are more difficult to communicate than starving children and there is a neglect of the crisis of human settlements. To some extent there is a sense of "choice" involved in our perception of settlement issues. People do not choose to starve or to die in volcanoes or floods. But for some reason, we view homelessness as a situation of choice. People do not choose to live on the streets or to move to the cities where there is no housing and few jobs. The homeless, therefore, are the sick, the malcontents, the lazy -- those who are "domestic refugees."

In developed countries there is some evidence that the society fears the effects of homelessness and the homeless on the immediate environment and family. This state of affairs has been described in a recent article with the title, "Helping and Hating the Homeless." Shelters for the poor (warehouses) are set up because of the dislike of facing the homeless on the streets or housing the poor and disadvantaged as neighbors. Canada is sponsoring a major Conference on the IYSH in September 1987 which has the following objectives for all who attend:

Understanding the conditions of human settlements and of homelessness in our own country;

Becoming aware of the extent of the human settlements crisis in other regions of the world, particularly in developing communities;

Forming new partnerships at the local level, involving governments, the formal and informal private sectors, and self-help, community-based organizations;

Developing enabling strategies to facilitate the participation of the poor and homeless in the development of their own shelter solutions.

The complex interrelationships between housing and health, along with the urgency of action measures, were described by **Hardoy** and **Satterthwaite**. Recent health studies in Third World cities show the degree to which lower income groups' lives are dominated by ill health, disablement or premature death. The studies point to very high infant and child mortality rates, high rates of serious injuries from household accidents and high proportions of people in each age group suffering from poor health for substantial portions of their lives. Malnutrition is very common. The studies also suggest that it is the house and its surroundings where most injuries and diseases are contracted. World Health Organization documentation suggests that improved housing could be one of the main defenses against poor health.

A direct contributing factor to the present situation is that most Third World countries have experienced a very rapid growth in their urban populations without the needed expansion in the public provision of services and facilities. The resulting health risks are further exacerbated by dangers from the sites on which houses are built. Large clusters of illegal housing often develop on steep hillsides, floodplains or desertland. Frequent flooding, water-logged sites, perpetually damp housing, lack of paved roads or paths, etc., all take a serious toll on health. Additionally, the housing environment is such as to increase the risk of all kinds of injuries in and around the house.

There are signs of changes in professional and public attitudes. Within the past ten years around 25 governments have given increasing importance to clean water and improved sanitation. The concept of upgrading slums and squatter settlements has become more accepted. Site drainage and the collection of household refuse have become more common as components of water and sanitation projects. Both health and housing researchers are finding links between health status and socio-economic factors. Research is revealing how the housing needs and priorities of women have been constantly misunderstood or ignored with serious impact both on their health and on the health of infants and children.

Yet almost no progress has been made in thinking through the institutional implications of these findings: how to ensure that government at national, city, district/municipal level has the power, trained personnel, knowledge and resources to tackle the housing and health problems of the low income majority.

In reality virtually all city and municipal governments in the Third World are failing to meet their responsibilities for addressing health or housing problems. They lack the investment capacity to make any impression on the huge backlog of needs for infrastructure and services as well as resources to maintain the facilities. It is not only a question of weak local government but also of inappropriate government structure. The problems need knowledge, resources and a multisectoral approach at local level, but they are being handled by governments which are weak and ineffective with power and resources highly centralized and rigidly divided into different sectors. A final reason is simply that many city and local (and national) governments are not elected and do not hold the welfare of the poor majority as a high priority. City governments insulated from popular pressures are more likely to concentrate scarce resources on prestige projects and buildings, bearing little resemblance to the priority lists of most of their citizens. National governments must take the lead role in changing the legislative base and in building up the power, resources competence and representative nature of city government.

WHO's new program on "Environmental Health in Rural and Urban Development in Housing" is identifying problem areas in association with both UNEP and UNCHS, promoting research and information for professional groups and local authorities. Surveys are to begin in selected nations to see how the inter-linked problems of health and housing are being addressed: by which agencies or ministries, at what level, with what resources and with what inter-agency or inter-ministry coordination.

Hardoy stated that we should approach the construction and management of Third World cities with the clear idea that they will be cities built with very scarce resources and through many individual and community uncoordinated efforts. It is important that all sectors involved understand the urgency of planning, building and managing cities with the resources available to each nation and, to a degree, even to each city. Three resources, if used properly, could change the face of cities for the better: improved management, land policies and people. Other resources are important. For example, a reorientation in higher education is required to train a new generation of urban doers with the attitudes for understanding the processes which are building Third World cities and facilitating these processes. Also required is a reorientation in mid-level technical education to provide more people with the skills required for the types of human environments where they live. **Newell** pointed out that much can be done to assist Third World countries in developing private sector investment programs. International banks and corporations could become involved in human settlements programs.

Finance systems must be established to promote savings mobilization for both formal and informal sectors and to develop organized investment programs in this field. Secondary mortgage markets should be established so that institutional investors such as pension funds, life insurance companies and other large aggregations of capital will be attracted to long term investment for housing programs, including related infrastructure and community facilities. Specific investment packages should be prepared. New legislation will be essential.

Among the basic conclusions are that better links should be promoted between community organizations and city governments; that urban and macro-economic policies should be integrated so as to provide a more stable and stronger economic base; and that solutions should be promoted with scale direction that benefit low income groups. Partnership between low-income Community-Based Organizations and non-governmental organizations should be encouraged.

Gakenheimer stated that international funding for urban infrastructure, including transportation, housing and water supply is less likely in the future to be concerned with "targeting the poor." This is a concept which has come and gone since the Stockholm Conference, as it was in 1972 that the World Bank adopted an urban lending policy which was to emphasize social, in addition to economic criteria, and "targeting the poor" through such programs as "sites and services" became matters of fashionable priority. But by the mid-80s disenchantment toward targeting the poor has accumulated and there are many reasons. Questions of management skills, replicability, land, community commitment and budget discontinuities are among the constraints and problems. These are in addition to the larger issues involved in sites and services projects, the distortion of urban growth patterns, the segregation of the poor, the social and transportation costs, the inhumanity of the spacial planning for sites and services projects with their densely packed, minimal lot sizes, etc.

The new policies of the lending agencies give emphasis to system-wide economic and financial viability and efficiency, with no mention of the urban poor or the managements of informal sector resources and capabilities. It is a basic change of strategy and it will be more difficult in the future to measure or evaluate the specific effects on the poor of such policies.

Separately, the Workshop observed that though the new major restructuring of the World Bank seems to downgrade attention to water supply and urbanization, reducing this sector to the status of a small division, there may be some wrestling with urban problems within the large new office dealing with Environmental matters which is due to have a professional staff of up to 100. This is a marked contrast to the handful of professional officers who have in the past dealt with urban questions within the Bank Structure.

Townsend pointed out that determining the real facts about human settlements, trends in their size and distribution, information and indexes on quality of life, energy utilization, and many other facts become essential in shaping new programs for the future. She suggested that more work should be done in revising indexes so that they become more useful in measuring present day realities. For example, the Physical Quality of Life Index from the UNRISD should be revised to include access to shelter because it affects to a great extent: life expectancy, infant mortality, and the literacy rate. There are indications that projections of urban growth and city size in Third World cities may be considerably skewed and inflated, especially in the light of the economic difficulties most countries have endured during the decade of the 1980s. Townsend also stated that Habitat efforts are not failures in themselves, but they have had little impact on many government policies or actions for a diversity of reasons and only a few countries have national

housing policies targeted to improving conditions for the very poor urban poor and rural landless inhabitants.

McGee described some of the significant transformations occurring in some Asian countries which are blurring the distinctions between urban and rural settlements. He has applied the terms "Urbanisasi" and "Kotadesasi," both terms used in Bahasa Indonesian, to more accurately reflect the processes operating in the Asian region. Urbanisasi is the term used to describe the urbanization process in its broadest sense, including the physical, demographic, economic and sociological processes involved in the growth of urban areas. Kotadesasi is a coined word, joining kota (town) and desa (village) to make up a word which carries the concept of urban rural activity occurring in the same geographic territory. Kotadesasi involves the growth of distinct zones of agricultural and non-agricultural activity which are characterized by intense interaction of commodities and people. This is not the same as rurbanization, a term never precise in its meaning, which has generally meant some persistence of rural traditions and values in urban settings.

China, Indonesia and Taiwan present outstanding examples of the breakdown of the urban-rural dichotomy through the Kotadesasi processes, which have five main features:

1. An increase in non-agricultural activities in areas which have previously been largely agricultural, including trading, transportation and industry -- a great mixture of activities often by members from the same household.
2. Extreme fluidity and mobility of the population. The availability of relatively cheap transport has facilitated quick movement over longer distances.
3. An intense mixture of land use, with agriculture, cottage industry, industrial estates, suburban developments and other uses existing side by side.
4. Increased participation of females in non-agricultural labor.
5. The fact that Kotadesasi zones are to some extent invisible or grey areas from the point of view of the state authorities.

Urban regulations may not apply in these areas of rural transition, and it is difficult for the state to enforce them despite the rapidly changing economic structure of the regions. This encourages the informal sector, small scale operators, and also permits the proliferation of squatter housing in these regions.

In China it is these Kotadesasi zones, the towns and townships, that there has been most notable development of enterprises and industries, as well as the

world's largest annual construction of "rural housing" totalling more than 10 million in 1986. These are largely built from the resources of the peasants themselves, who have increased their productivity and savings as a result of the agricultural reforms and the growth of the responsibility system, enabling them to sell on the free markets the percentage of their production exceeding their contractual quotas. Up and down the Eastern coast of China the Kotadesasi zones are growing, proliferating and prospering, as marketing opportunities continue to expand for both agricultural and industrial products.

In China there is considerable urban-rural interaction, in part because municipal borders tend to incorporate agricultural zones and there is general encouragement for the self-sufficiency of cities of their food production. Municipal governments are responsible for administering both industrial and agricultural production, as well as being responsible for provision of housing, usually in cooperation with work units. China has encouraged crop diversification in areas adjacent to the major urban cores, and also encouraged industrialization in the major zones of urban-rural interaction.

Asian governments especially will now have to recognize the reality of these zones of intense urban-rural interaction and direct much of their investment to these areas, especially for infrastructure and services. Problems of environmental pollution require special attention as an outgrowth of the mixture of land uses. Access must be improved in these zones with improved roads and railway communication, but such investments will yield early real development rewards.

Asian governments should develop new spacial systems of data collection similar to those of the "living perimeters" of Taiwan which enable them to more effectively monitor the impact of investment decisions on labor force composition, income, etc. within the zones of Kotadesasi. A good deal more research is also required about these gray zones, so as to assist the timing of government strategies and gauging their fiscal ability to implement them.

Perlman urged more concentration on the development of Mega-Strategies for Mega-Cities in the process of re-thinking Third World cities. Even though there is doubt about some projections of increased urban growth and the size of cities, there will be unprecedented challenges and opportunities posed by the world's largest cities by the year 2000. There will be about 78 cities of 4 million or over and 22 mega-cities of over 10 million population which may range in size up to 26 million largely located in Latin America and Asia.

Present-day cities are shaped by the application of technologies invented one hundred years ago, such as steel frame buildings, the skyscraper, elevators, indoor plumbing, electricity, the light bulb, electric trolley, internal combustion engine and automobile, the subway, the telephone. In the last twenty-five years many new potential technologies have emerged in various fields which hold considerable potential for application in urban development situations. On another level, there is still great opportunity for more widespread application and blending of such well-known technologies as improved adobe, bio-gas, solar energy, wind energy, aquaculture, sewage treatment, water filtration and composting.

What is required are programs by which scientific or management experts can work with the local governments, the community and the private sector to develop, adapt and implement innovative and appropriate technologies. New partnerships between the public, private and voluntary sectors and the science and technology community are essential. There is a need to develop inter-city and international networks and a central clearing house for research, information exchange, and hands-on technical assistance and networking. The Mega Cities themselves should be capable of generating funding to encourage the application of human ingenuity to solve some of their pressing problems.

The scarcity of urban land for application to settlement development, especially for the poor and low income households, is frequently mentioned as a major obstacle to progress. But **May** pointed to the fact that many LDC governments and their private sectors have extensive experience with each of the components of land assembly and development programs. However, few have integrated these efforts or undertaken them as a regular activity. All governments have machinery for acquiring land for public purposes either by purchase, condemnation or expropriation. For example, the Republic of Korea and Taiwan have public programs for land assembly, development and sale, with the government retaining a part... for sale itself to recoup costs of urban infrastructure. This type of program would seem to have wide application for helping to develop integrated human settlements projects.

Humanistic concerns about the effect of the urbanization phenomenon on the individual's role and perception of society were raised by **Escande**, a friend and colleague of the late Rene Dubos. Learning to live in big cities and promoting participatory democracy represent challenges for a human architecture of life, as opposed to anthill or beehive activity. The lack of organization of suburbs is a particular problem leading to the comment that while we provide cubicles and housing for the people, they have been robbed of the town. Another comment is to the effect that when the town stops growing, urbanity can still grow. Rene Dubos had said that just as scientists consider that ecological problems must be considered in a scientific way, so was he also convinced that more research and the development of scientific approaches were required to deal with the problems of the city.

Mexico and Colombia were cited as examples of innovative developments in programming and action for human settlements improvement. The various crises of recent years in Mexico had produced a major restructuring of urban policy and planning concepts. The need for urgent reconstruction following the earthquake had led to new forms of solidarity and action, stressing decentralization, social participation and the mobilization of resources. Though such ideas had long been discussed by professionals, now they had been turned into operational practice, with the encouragement of SEDUE, the Ministry of Urban Development and Ecology. A key instrument was the financial entity, FONHAPO, the Foundation for Low-Cost Housing, which was working with municipalities, cooperatives, housing associations and other organized groups throughout the country. Its practical credit and financing arrangements had resulted in a high rate of construction accomplishment.

Echeverria reported that in Colombia, after five years of record housing production, the government has now embraced a new strategy for the "total elimination of poverty." This concentrates on projects and programs for the improvement of slums and marginal settlements and other works to improve the quality of life of the poor. The experience with large projects of "sites and services" had not been successful and they were basically destructive of normal patterns of urban life. More attention should be paid to the location of infrastructure and to the distribution of social benefits, as well as the generation of employment. Projects should foster a sense of citizenship and dignification. In Colombia, NGO's and CBO's are properly recognized by the authorities and have important roles in many areas. There are now in existence several secondary level organizations, such as the Federation of Low Cost Housing Associations (Fedevivienda) which provides practical training for work in the communities and also promotes participation and the application of appropriate technologies for self-help building. In Colombia there were also several tertiary level "Confederations" which engaged in more direct lobbying and promotion efforts on behalf of their constituencies.

In Colombia the BCH, Central Mortgage Bank, provides funding for innovative urban development projects with much housing built in cooperation with the Instituto de Credito Territorial, the national housing agency. The private sector Corporations for Savings and Housing are also required to invest in the programs for low income families either by buying bonds or engaging in projects directly.

Colombia was also giving special attention to municipal management improvement through Schools and Institutes of Public and Municipal Administration.

It was stressed that there was still much to do at the international level to develop a constituency and support for international shelter programs. Much is in place now, however, for the establishment of an effective network in this field. The Habitat International Council, formerly the NGO Committee for Human Settlements, has served as the main vehicle for representation of national and international NGO's. As the result of changes approved in recent months the HIC is to be renamed as a "Coalition" and will be more regionally representative. Also, its Secretary General will be from a developing country. These are steps in a process expected to convert the HIC into a stronger lobbying force for human settlements within the agencies of the international community. A more representative and more powerful constituency will also be necessary in helping to influence opinion leaders and the media generally.

Another international effort designed to promote more private sector support for international housing and shelter programs is the series of International Shelter Conferences. Two have been convoked to date, one in Washington, D.C. in 1984, and one in Vienna in 1986. The latter Conference resulted in a "Vienna Declaration" and report which urges that governments should reconsider their housing policies and take on more of a role as facilitators for private housing construction efforts rather than endeavoring to provide housing directly. The third ISC will be held in Colombia in 1989.

In conclusion, the Workshop endeavored to define some of the areas of both constraints and opportunities for human settlements. Fighting for human set-

tlements programs is inherently more difficult than mobilizing support for a particular environmental cause which can be sensed to be of more direct and personal benefit and is perhaps more selfishly motivated. Another real problem is the fact that current university and educational institutions in developing countries are tending more and more to promote professional elitism, ignoring the real economic and social problems. Public service careers seem ever less desirable and the sense of community and social responsibility becomes seriously diminished.

Concern with human settlements should not be considered as derived from charitable impulses alone. Proper organization of this sector can be a vital factor in economic stimulus for world development.

The concept of sustainable cities will require large-scale investment and commitment. But there is always the hope and expectation that the progress of disarmament efforts will release new resources for international environment and development programs, including human settlements. We should begin to think seriously of five year perspectives and programs with defined goals, targets, and evaluation measures. The IYSH is producing networking possibilities among many different groupings in various countries. But it is at the community level that the most effective work can be done, where understanding and experience can be accumulated, and this is where networking will have its major impact.

People's attitudes can be altered in various ways, through technical assistance, education, community activity, the mass media, etc. Public policy entrepreneurs must be alert and attuned and ready to help move and influence public opinion in every way possible. Radio programs have special value in promoting a sense of participation as do community museums, street theater, poetry and many other types of performance settings.

It will be important to watch and wait for political windows of opportunity. Groups all over must be ready with specific agendas for action at all levels and with statements of "Here's Something That Can Be Done!"

WORKSHOP V:

MANAGING TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

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CHAIRMEN'S INTRODUCTION

Robert A. Frosch and Peter S. Thacher

Frosch:

I have tried to divide the institutional problems into three areas. There are local problems, which, although they are principally local, they can be the same in many places. If you are not careful, you can turn a local hazardous substance problem into more than a local problem, into a regional problem, perhaps even into a global problem.

There are regional problems which may originate locally, but become regional by distributional effects. Acid rain is just such a problem. There are questions as to how these problems should be dealt with, regionally or locally.

And finally, there is a class of truly global problems, some of which are not humanly mediated as far as we can tell. Sea level changes are one, global carbon dioxide and the greenhouse effect is another, and the ozone problem is a third. These are inherently global challenges and it is not always easy to see whether local action can in fact lead to an organizational process that performs a useful task.

We tend to think in terms of grand plans and global strategies, but none of us has been very good at either devising them or carrying them out. The United States is about 200 years old now and in all of its history, it has been trying to figure out the balance between the role of the central government, the role of the states and the role of the local governments. We are still working on that every day and we are not nearly 200 years into trying to do the same thing for the whole world at once.

Some of us believe that one way to approach this is by both creating and seizing policy opportunities with some attempt at a balance between single and multiple issues. This set of problems for any of our environment and development questions gives us a whole set of political, organizational and process questions which overlie and interact with all of the substantive ones we have discussed. We have a number of active participants in our group who have individual comments on various aspects of this, and out of it we will try to see if we can make some general statements.

Thacher:

At the risk of adding another matrix, it seems to me that it will be useful in our workshop to bear in mind three general categories of institutions: governmental institutions, at both the national and international levels; non-governmental, particularly membership organizations; and a third and equally important category, the private sector.

I believe that it is indeed easier to think globally than it is to act locally. I believe the Brundtland Commission report calls for acting locally, even with regard to global issues. It seems to me that we have some help in the membership of the workshop. I am counting on Ambassador Sahnoun and Jim MacNeill to keep us honest with regard to what is in fact in the Brundtland Commission Report.

It seems to me also that we have a good deal of insight into one particular global issue and I hope that Fitzhugh Green will give us some leadership from the floor on this one. Namely, how we got to where we are today with regard to protection of the stratospheric ozone layer. I don't know if many people here know this, but the process was started way back in 1971, in large part by Carol Wilson with his study of man's impact on the climate. The early concerns over the stratospheric layer had to do more with the climatic alterations than with cancer and other biotic alterations.

By the mid-seventies, UNEP had persuaded governments, including that of the United States to give this thing a launch. They convened a meeting that was hosted by the United States government in the State Department in March 1977. That meeting was the first intergovernmental meeting that started looking at the problem of the ozone layer. It adopted what Mostafa Tolba has later come to use in many of these approaches, a comprehensive plan. We wanted governments to begin to talk about an agreement in this area. Understandably, governments were not yet ready: they wanted the assessment process to be much more credible and improved.

So a CCOL -- a Coordinating Committee for the Ozone Layer -- was started. While the CCOL prepared the way for the negotiations of the Vienna Convention of March 1985 on the protection of the ozone, it was a process that actively involved NGOs of all sorts, particularly in the conservation and the environment areas, The Sierra Club in particular; but equally, it involved such organizations as the International Chamber of Commerce, the Chemical Manufacturers Association of America, and a number of corporate entities.

It was a very dynamic process, there were lots of conflicts, but the end result was that the assessment was very credibly improved, more Dobson instruments were deployed in different parts of the world than might otherwise have been the case, more public opinion was mounted, and more public education took place.

I think this committee, the workshop that Bob and I are going to try to lead here, can make a particularly useful contribution if it can identify the actions and the direction in which non-governmental organizations and the private sector should be encouraged. This way, they may begin to join forces with government officials and organizations that are beginning to try more effectively than ever before to cope in an anticipatory way with some of the bigger problems that are coming down the pipe.

The recommendations that are in the Brundtland Commission Report with regard to non-governmental, private sector, academic, and scientific organizations at the national and international level, deserve our particular and immediate attention.

SPECIAL REPORT

Thomas F. Malone

Introduction

It is timely that we pause midway between the 1972 Stockholm Conference on the Human Environment and the threshold of the 21st century to assess progress towards the goals of that Conference, to examine the evolution in attitude and perception about the human environment, to consider strategies for action and to address needed institutional and legal reforms. In particular, it is becoming clear that a crucial point has been reached in global thinking concerning environmental issues. The catalyst was the publication of the report of the World Commission on Environment and Development, Our Common Future. This document crystallized the concept that, on a global basis, environment, resources, population, economy and security constitute a seamless garment. Independent evidence that this is an idea whose time has come is provided by the action of the World Bank, announced in May 1987, in moving environmental concerns from the periphery to the center of the bank's development policies. In announcing the reorganization, Bank President Barber Conable noted that

Environmental action adds a new dimension to the fight against global poverty. It recognizes that sound ecology is sound economics. Indeed, the objectives of sustainable economic growth, poverty, activation and environmental protection are often mutually reinforcing.

This leads directly to the concept of sustainable development as the framework within which environmental policies and development strategies are inseparable. Of fundamental significance was the Commission's initiation of the process to develop "A Global Agenda for Change" that would pursue an imaginative, realistic vision of our common future and articulate the institutional innovations and legal reforms necessary to transform that vision into reality.

Environmental Achievements

Significant achievements of the last fifteen years include:

- Consciousness of the importance of quality in our physical environment has spread throughout the world. Seeds of the political will to take action have been planted. Evidence that these seeds have begun to sprout is found in the number and variety of national programs that have been initiated. Between 1972 and 1984 the number of countries with agencies involved in en-

vironmental issues grew from 24 to 145. Over 5000 non-governmental organizations are active in environmental and resource issues. Progress at the international level is documented by the success of UNEP's Regional Seas Programme, the achievements bringing sovereign nations into international agreement on measures to limit the production of chlorofluorocarbons that threaten to deplete the earth's ozone shield, and the scientific consensus reached on the prospects for global warming from an increase in atmospheric carbon dioxide and other gases and exploration of its implications initiated.

- Attitudes toward the central issue of population have changed dramatically, especially in the Third World. Population there is expected to grow to 6.8 billion by 2025 -- an increase of 84 percent over 1985. In contrast, the population in developed regions will grow to 1.4 billion for an increase of about 18 percent. [1] An attitudinal change was sharply illustrated by the contrast between the Bucharest conference on population in 1974 and the Mexico City conference ten years later.

- Gaps in the knowledge base in the natural sciences have been identified. Plans are being prepared for a decade-long global research program to understand the interactions of the physical, chemical and biological processes that regulate the total Earth system, the unique environment it provides for life, the changes that are occurring in that system, and the manner by which these changes are influenced by human actions. [2]

- A beginning has been made on the complex task of establishing a conceptual framework for integrating incomplete knowledge of the physical and biological systems with an equally incomplete understanding of the social, economic and value systems. [3] The long-term objective is to arrive at policy recommendations for the political process that make the decisions by which society can select from several options that course most likely to lead to sustainable development of the biosphere. In the book, Sustainable Development of the Biosphere, edited by Clark and Munn, the multiple equilibria, thresholds and bounds, discontinuities and nonlinearity that characterize the link between human activity and the environment are explored by an impressive array of scholars.

- One of the most important achievements has been a subtle but profound shift in emphasis from focussing on the bad things (problems) that might happen to the good things (opportunities) that could happen. The "sky is falling" syndrome is

replaced by a vision of the future to which society might realistically aspire.

The Process

The World Commission proposed seven strategic imperatives as central to transform present, often destructive, processes of growth into sustainable development paths:

- Reviving growth -- Reversing the sharp decline in economic growth from 1981 to 1985 when it was outstripped by population growth in most developing countries. A minimum of 3 to 5 percent per capita national income growth is essential to alleviate absolute poverty and work toward equity.
- Changing the quality of growth -- More emphasis on social development, including education, health, economic stability and equity, and less single-minded focus on material- and energy-intensive development.
- Meeting essential human needs -- With 6 million persons entering the labor force annually over the balance of this century, the pace of economic development must be sufficient to ensure adequate food, clothing, housing, water, sanitation, and health care.
- Ensuring a sustainable level of population -- Population policies which provide a continuing balance with the productive capacity of the global ecosystem.
- Conserving and enhancing the resource base -- Prudent management of both renewable and nonrenewable resources to fulfill our obligations to each other and to future generations. The availability of energy and the capacity of the biosphere to absorb residuals of energy use requires particular attention.
- Reorienting technology and managing risk -- Generating new and alternative technologies, improving traditional ones, and technology transfer should be guided by a combination of developmental and environmental considerations. There is much to be accomplished by constructing better vulnerability and risk analysis for increasingly complex technological systems.
- Merging environment and economics in decision making -- Integration of economic and ecological systems, as well as intersectoral linkages within each system, needs to be addressed at local, regional and international levels. Effective citizen par-

ticipation is a challenge in view of the multi-faceted nature of the decision process, but it is a necessary attribute to policy formulation and implementation.

Institutions

The institutional framework should be responsive to the needs of the array of seven systems the World Commission suggested are necessary for a strategy to pursue sustainable development:

- A political system that secures effective citizen participation in decision-making.
- An economic system that is able to generate surplus and technical knowledge on a self-reliant and sustained basis.
- A social system that provides for solutions for the tensions arising from disharmonious development.
- A production system that respects the obligation to preserve the ecological base for development.
- A technological system that can search continuously for new solutions.
- An international system that fosters sustainable patterns of trade and finance.
- An administrative system that is flexible and has the capacity for self-correction.

A suggested overall strategy involves the following principal recommendations:

- Within the U.N. system, the erosion of support for UNEP should be halted and reversed. It is the most effective catalyst in the U.N. family of agencies and has made a promising start on the mandate given to it by the Stockholm Conference, even though its resources have been slender and decreasing in recent years. Other specialized U.N. agencies should broaden their capabilities to relate their mission to development.
- Given the major role of technology in integrating environmental and developmental issues to achieve our common future, and the central role of private sector industry in market

economies and/or industrial ministries in centrally planned economies, a substantially strengthened network of industrial ministries is an imperative.

- The political, catalytic power of nongovernmental organizations operating in an independent but coordinated manner with governmental organizations has been demonstrated by the work of the World Commission. The activities of the nongovernmental International Council of Scientific Unions and the operating capabilities of Canada's International Development Research Center provide further examples. [4] A decade-long effort during the 1990s would be a discrete, but important, step in providing a solid foundation for implementing the general objectives outlined by the World Commission.

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SUMMARY REPORT

Robert A. Frosch

I would like to begin by calling attention to the summary of the Brundtland Commission report which raised the question of how we are going to accommodate the tremendous increases in population, particularly in the developing world, between now and the year 2000, when we are already having difficulties. The report marks a major change in attitude because it brings together the issues of environment with those of development and asks for a vision of the future which will lead to a more prosperous, healthy, just and secure world as a target.

We divided our questions of institutional arrangements into three subjects which we have labelled vision, process, and institutions. With the vision, we hoped to get some idea about what the ideal state would be and also some idea and way of assessing, sorting out and prioritizing the problems that have to be dealt with so that they can be attacked. We echo in particular the report of the World Commission in saying that UNEP has a particularly important role both in assessment through Earthwatch and similar processes, and as a leader in the assessment of risks for environment; both of these coupled with the sustained development problem.

By process, we refer to the means that have been used successfully in working on global problems today. Particularly, the process is one in which problems have been raised and a variety of institutions and institutional mechanisms have been brought together -- intergovernmental mechanisms, governmental mechanisms, nongovernmental institutions including industry, private organizations, NGOs and individuals -- in a process of discussion and assessment of the problem. This should lead to: some kind of agreement about what sorts of activities might be undertaken to solve these problems; agreements to take action, which may be formal international agreements or informal agreements among industry and other parties; and action which helps to solve the problem. We believe that the evolving work on the ozone and chlorofluorocarbon problems is a good example of this kind of process.

Finally, there is a management phase in which one works on the process, and then a later assessment phase in which one decides whether real progress has been made or whether other things have to be done. Looking at this defined interactive process, we note that it needs leadership and, as we come to discuss the various kinds of institutions, we have some comments about what role various institutions may play.

In particular, I come back to the previous statement that UNEP has a special leadership role with regard to helping the development-responsible institutions to internalize the environmental consequences of development into their work, so that environmental consequences and development go together. This is part of the meaning of the sustainability of development: the fact that it deals with the overall

environment in such a way that long-range solutions, not just short-range solutions, may be found.

Government organizations, particularly in the developing world, need to take action so that the local groups, particularly in developing countries, can be empowered by means of a flow of information and knowledge, to play an appropriate role in solving environmental, developmental problems in those countries.

We see very large and expanding roles for nongovernmental institutions including industry, civil groups of various kinds, and individuals. Particularly, we think that what is needed to make this feedback and consensus-building process work is a strengthening of nongovernmental institutions of all types -- particularly in developing countries -- so that we can get real participation and ownership of the process and the solutions. In order to do this, several things have to happen. The NGOs -- and particularly those NGOs who think of themselves as environmental NGOs -- have to expand their purview so that they take on some responsibility for the process of sustainable development, along with a responsibility for the process of environment: the two now have to be coupled for success.

A particular role that we have in mind for existing NGOs, the bulk of which are in the developed countries, is to help strengthen the capabilities of the nongovernmental institutions that are required to play a role in this process. This is particularly important in the developing countries, where there are many nongovernmental institutions but where more are needed and stronger institutions are needed. It is also important that the networks for the flow of information amongst all of the different organizations and countries involved be strengthened.

We note that the media and the educational systems have a vital role as transmitters of information and as transmitters of the visions that we are trying to construct. They are essential in developing the capacity of individuals to support, influence and participate in this process of identifying and finding solutions to these problems.

There is also a need to use the process more generally than in just the environmental and sustained development fields. We need to work on the whole question of the deployment and redeployment of intellectual and economic resources in order to solve these environmental and sustained development problems, and in particular to look for ways of redirecting the debt problem. Our world needs to view debts as money or potential money in places where it can be made useful.

We put particular emphasis on the process as the way of defining what the institutional requirements will be. In listening to the reports of the other groups, it seems that the same institutional and process things have been emphasized three or four times in perhaps slightly different contexts. I think we have a set of workshops with the same kinds of institutional and process recommendations.

SUMMARY OUTLINE:

DEVELOPING A MODEL FOR INSTITUTIONAL ACTION

Mark Austin

1) The Vision

- A) The Ideal
- B) Attitudes
 - Environment & Development
- C) Initial Awareness of Divergence from Ideal (the Problem)

2) The Process

- A) Individual Phase
 - Initiative Takers
 - Identification of Stakeholders
 - Education Process
- B) Shared Assessment Phase
 - Agreement that Problem Exists
 - Agreement on Nature of Problem
 - Agreement that Risk Necessitates Action
- C) Shared Management Phase
 - Options analysis: Cost/Benefit/Risk
 - Action
- D) Feedback Phase
 - Continued Assessment
 - Review
 - Corrective Action

3) Necessary Institutions

- A) International Organizations
- B) Governmental Organizations
 - Legislatures
 - Judiciary
 - Agencies with Regulatory Power
 - Foreign Ministries
- C) Non-governmental Organizations
 - Corporations and Industries
 - Constituency Organizations
 - Labor
 - Consumers
 - Other Stakeholders

- Citizenship Organizations
- Science & Technology Organizations

D) Media (Fourth Estate)

- Communications Media
- Information Exchange Networks

4) **Future questions proposed in order to expand and elaborate details of the model**

A) Is it appropriate...

- across varying localities in climatic/human/governmental situations?
- across varying types of environmental problems?
- with respect to degradation of varying resources?
- across varying scale problems, i.e. global, regional, trans-boundary, national, local?
- given varying causes of degradation?

B) What can be done on a global basis to enhance each aspect of this process on a local level?

AWARDS DINNER

GREETINGS

Richard Barth, Dinner Chairman

Rene Dubos firmly believed that there need not be conflict between the goals of the private sector and the concerns of the environmental community. In his words, "With our knowledge and a sense of responsibility for the welfare of human kind and the earth, we can create new environments that are ecologically sound, aesthetically satisfying, economically rewarding and favorable to the continued growth of civilization."

Blessed with the twin visions of a scientist and a humanist, Dr. Dubos was confident that we have within our power the ability to improve on nature. This very gathering provides proof that Dr. Dubos was right, for it brings together people of different perspectives and sometimes conflicting approaches who are nevertheless united by a determination to move ahead to find balanced, workable solutions to environmental matters.

And so, as the Forum starts, my best wishes to those of you who will be participating over the next two days in the deliberations of the "Only One Earth Forum." A special greeting to the more than one third of you who have traveled abroad to attend the forum, and my thanks to those of you and your organizations who have contributed financially to the Forum and the important work of The Rene Dubos Center.

AWARDS DINNER

REMARKS

Hugh Downs, Master of Ceremonies

This evening commemorates the 15th anniversary of a historic event -- it's kind of hard for those of us who were there to realize that it was fifteen years ago that the United Nations Conference on the Human Environment in Stockholm took place. This evening also celebrates the lives of two of it's architects, Barbara Ward and Rene Dubos, co- authors of one of the really great books about the human environment, Only One Earth. It was a landmark book and conceptual guidelines for that event and subsequent events.

Those of us whose lives have been influenced by these world citizens know that their enthusiasm for living was based on their faith in humankind, and it reflected the enormous courage that it takes to be optimistic -- to maintain optimism in the face of some evidence that tends to erode one's optimism. They personified the maxims on which the Rene Dubos Center was founded:

"Think globally, but act locally." That phrase illustrates through historical and contemporary examples, that, whereas most important problems of life on earth are fundamentally the same everywhere, the solutions to these problems are always conditioned by local circumstances and choices.

"Trend is not destiny" -- that's another one of Rene Dubos' statements -- and this, on the other hand, illustrates that, whereas biological evolution is irreversible, social evolution makes it possible for human societies and individual persons to change their course and even to retrace their steps when they judge that they are moving in an undesirable direction.

I remember -- along with many others -- Rene Dubos as one of the truly great prophets. He said to me once that he believed that science of the future was going to put less and less emphasis on force and substance, and more and more emphasis on information and relationships. And that's certainly being borne out now, in genetic engineering and in particle physics; in almost every discipline that seems to be true, and it was very prescient that he saw that. This social and environmental philosophy has never been more relevant than it is now and here.

For example, this evening The Dubos Center is presenting for the first time one of three major awards to an organization, the World Commission on Environment and Development, better know as the Brundtland Commission. Chaired by the Norwegian Prime Minister, Mrs. Gro Harlem Brundtland, the commission is being recognized for its recommendations that give credence to the Dubosian con-

tention that "trend is never destiny," since human beings hardly ever remain passive when they're faced with dangerous or unpleasant situations. Also, and more importantly, the Only One Earth Forum will develop principles and strategies for action at the local level, based on the Brundtland Commission's report.

The Dubos Center's Forum Program originated some ten years ago, and during discussions with Rene Dubos, Jean Dubos and the Eblens, Bill and Ruth, Ruth Eblen, the Executive Director of the Dubos Center, brought her United Nations experience and global thinking to bear on local environmental education programs, and I would like to have Ruth stand up now if she would.

And since I think we all understand that behind every successful woman there is a man waiting to be recognized, I'd like now to invite Ruth's husband, Bill Eblen, who is President of the Board of Trustees of the Center, up to the podium for the award presentations.

AWARDS DINNER

REMARKS

William R. Eblen

Thank you, Hugh. I must say that you made our day when you agreed, once again, to dignify our dinner with your presence, not only because of your grace and charm and good looks, but more seriously, because of the depth and breadth of your knowledge of our human environment and familiarity with the philosophy of the Center's founder.

On behalf of The Dubos Center I would like to thank our dinner chairmen, Dick Barth, Bob Kennedy, Taylor Briggs, and Lawrence Small; the dinner committee, sponsors and the other contributors who have supported this celebration thereby assuring the dissemination of the information this important forum will generate.

This audience is living proof that the alarmism and crisis-orientation of the environmental movement of the 1970s has evolved into a true spirit of cooperation and a willingness to tackle problems, not only between traditional adversaries such as industry and nature-activists, but between large corporations and small civic groups and among nations and regions as well. Nothing better affirms one of the key beliefs of the Center's founder, Rene Dubos, which was: "Trend is not destiny."

In the early 70s, computerized projections were predicting rampant overpopulation, starvation, destruction of resources by the year 2000 "if present trends continue." Well, trends hardly ever continue, particularly if people -- or even one person -- really want to change them. This isn't to say things aren't bad, even crucial. But we can turn them around. And people on every level are beginning to realize this and start acting.

For example, just this week I noticed four articles in The New York Times that bear this out:

The World Bank is initiating sweeping new measures -- new structures and new people -- to make protection of the environment central to their policies in developing countries.

For the first time in Peru the government has started organizing a comprehensive parenthood program.

Likewise, in Nigeria, Africa's most populous country, the government has drawn up the first national family planning program which is expected to be adopted next month and is considered to be the most ambitious in Africa.

Finally, under the leadership of Mostafa Tolba, significant agreement was reached on the recent international accord to freeze production of chlorofluorocarbons starting in 1990 and later reduce their production in order to stop destruction of ozone in the upper atmosphere.

Tonight we have with us the principal architects of these signal events that have taken place just in the past few weeks that bear out that very ability of individuals to will the future.

Rene Dubos said, "The willed future always prevails over the logical future where human beings are concerned." And tonight we salute three examples of that kind of international leadership.

AWARDS DINNER

KEYNOTE ADDRESS

William D. Ruckelshaus

You have met several members of our Commission here this evening, all of whom have made significant contributions to the Commission's work. We have with us the heart of the Commission in Margarita de Botero from Colombia; we have the head of the Commission in Mohamed Sahnoun, the Ambassador to the U.S. from Algeria; we have, in the recipient of the award given on behalf of the Commission, Jim MacNeill, somebody who worked long and hard to bring the hearings and all of the data, information and geography that we had to absorb into some kind of coherent whole. You heard from Maurice Strong, who not only was the godfather of the Stockholm Conference, but who remained active in attempting to bring the world's understanding of the problems of the environment and their interrelationship with development up higher on the world's agenda. He did that so skillfully as a member of the Commission and he now carries on the work that he started in Stockholm.

The members of the Commission really were a dispersed lot, from all over the world. There were twenty-two of us and fourteen developing countries were represented; there was a Russian, a German, a Yugoslavian, along with Chinese and Japanese representatives and the finance minister of Zimbabwe. When we first started, I wouldn't have given us a very good chance of coming to a consensus about what the problems were all about. After all, think about the problems that we tried to deal with. The U.N. not only gave us twenty-two people from varied backgrounds, perspectives, nationalities, constituencies, and pressures, but they gave us a global agenda made up of pollution, population, resource depletion, and energy and food supply. Not to be daunted by that agenda, we added the issues of third world debt and nuclear disarmament.

If you took any one of those issues and handed it to a state legislature in this country and said, "In three years, tell us what you think we ought to do about it in your state," your chances of coming to a consensus as to the nature of the problem and some solutions to it, even in a geography as small as a state, would be slight. To take all of those issues together, bring people from all over the world and ask them to come up with a definition of the problems and some recommendations concerning the problems in three years was indeed a task that seemed beyond anybody's capacity.

I think what happened to us over the three year period was that we came to believe that what we all agreed about was a lot more important than what divided us. We were asked to serve not as representatives of the United States, or

of Canada, or of Algeria, or of Colombia, but rather, we were asked to serve in our individual capacity, as citizens, as people, and we were given a very difficult charge. We were told to come up with a clear definition of the global problems of environment and how they related to the aspirations for development in much of the world and to offer some solutions.

As the time wore on, we came to know one another better: barriers began to drop and we truly began to communicate with one another. It dawned on all of us that it was more important that we tell the world what we had seen and heard and believed, than to tell our constituents throughout the world what it was that we didn't agree with and where we stood, versus the rest of the world.

It is clear, I think, that if any single member of the Commission had written the report, it wouldn't read the way it does. All of the conclusions and all of the findings would not be the same. But what we arrived at was as close as we could come to a consensus. We were so determined at the end to come to a consensus that we simply wrote over the things that divided us.

We saw a lot of things that brought us together. We saw people from farms in Botswana talking about how the use of cattle for grazing on their land was destroying it, both as wildlife habitat and as useful land for growing beef. We listened to the rubbermen from Brazil, to bureaucrats from Russia, and to Japanese social workers. We saw sincerity, we saw worry and we saw hope. We all learned to change our attitudes since Stockholm; many of those who came to Stockholm heeding the siren song of Maurice Strong, so suspicious of the issue of the environment, had changed their minds.

As a delegate from this country to the Stockholm Conference, I convened a luncheon for the representatives of the twenty-nine nations in Africa south of the Sahara. At the luncheon, I heard one of them after another get up and say that, "The environmental issue is an issue of the developed world and it is really just a screen to keep us less developed. When we industrialize as you have, when we are capable of providing food, clothing and shelter for our people, then we will worry about the unwanted side effects of industrialization. Until then, don't try to fool us with your call to environmentalism or to be concerned about the carrying capacity of the planet, as you call it. That's not our concern." But that has all changed. Their desire for development, not just economic development, but social, cultural, and political development remains unabated. Their desire to participate fully in the human condition in the world is as strong today as it was fifteen or seventeen years ago in Stockholm. But they have recognized that, in order to develop, they must take into account what they are doing to the environment. Sustainable development means sustainable, not only in an economic sense, but in an environmental sense. The recognition of the necessity of tying environmental protection in with economic development is becoming widespread in the world today and that is a very good sign.

There needs to be an understanding in this country that not only is protecting the environment of the globe essential to full economic development and that the rest of the world must share in the fruits of development, but that it is possible, in this part of the world as well, to both grow economically and protect the environment. The two goals are not necessarily in opposition to one another, as we might have thought in the past.

Poverty is not just a slogan of the developing world when they talk of it as the biggest environmental problem in the world, for it is the biggest environmental problem in the world. There is no way that people in much of the world are going to pay any attention to the tropical forests or to the advancing desert or to any of these problems unless it is possible to couple these problems with sustained development.

The Commission's report will not change the world overnight and it will not lead us all into some promised land. But we hope that it will push these issues up on the international agenda, that it will inform the debate, that it will cause people to think again about how interconnected we all really are.

As I thought about what I would say tonight, I thought about the man whose name this forum honors. We have heard it over and over again here tonight about "only one earth" and how "trend is not destiny" and "think globally and act locally." You not only hear those phrases and those ideas in a forum of this kind, honoring that great man, but you hear them all over the world in a variety of ways, but it remains the same thought. The title to the book that he wrote with Barbara Ward, Only One Earth, was remarkably prescient. The World Commission on Environment and Development Report echos so many of those themes struck by Rene Dubos during his life.

The Commission itself, in the face of some very serious global problems, trends such as pollution and resource depletion, saw some encouraging success stories around the world in places where local action had replaced global hand-wringing. And it certainly came home to all of us that the planet is only one earth. The poverty in the south, which contributes to the advance of the desert in Africa or the destruction of the tropical forests in Africa, South America or southeast Asia is not just their problem, it is our problem. We are all in it together.

We Americans need to think long and hard about the future of the world and our part in it. We no longer dominate the world as we did in the decades following the second World War, either economically or militarily; and it is very, very unlikely that we ever will again. But we are still a major force in the world and with that position goes a major obligation of leadership. We have an election coming up in 1988 in this country and we the people must seek to elevate the dialogue to see which of our leaders sees the oneness of it all; to see who sees the opportunities this country has to show what can be done to alleviate the unwanted side effects of industrialization. We need to find those who can convey our wisdom, or

at least our knowledge to others who now try to industrialize and who we suggest should anticipate and prevent because that is far cheaper than reacting and curing. These slogans that find their way into any movement in the world really do have some underlying meaning. It really is far wiser to avoid pollution than it is to clean it up later on. It is also a lot cheaper.

Which of our leaders see the global trends of the planet's warming and the depletion of the ozone? Even though the science is admittedly incomplete and probably will be for the foreseeable future, who sees the need for some cautionary action and some serious planning for how to adjust if the predictions of some relating to rise in the sea level become a reality?

Which of our leaders sees that the answer to the problems of uneven trade lie not with closing borders, but with opening minds to the global advantages of freer trade? Which of our leaders sees that the answer to the problems of global poverty and poverty's fellow traveler, environmental degradation lie not in lecturing debtors and demanding blood from a stone or trees from a vanishing rainforest. But rather, we should provide the world with the wherewithal, the dollars, the technical assistance, the political wisdom, to develop, to grow, to prosper, to become a full participant in the world economy and protector of the world's ecology. If this campaign and its candidates ever begin to illuminate who has answers to these and many other questions raised by the Commission's report, we may begin to find our way into tomorrow's world.

We all watch these disturbing trends with transfixed fascination, but their reversal may only come about with man's wise intervention. Certainly Rene Dubos believed that it was only with man's interventionist wisdom that man's stupidity could be overcome. If intervention is to be effective, obviously, it must be based not only on wisdom, but on courage, the courage of us all. We must insist, we Americans, that our leaders lead.

Lastly, as we celebrate in 1987 the two-hundredth anniversary of our Constitution, in conjunction with the fifteenth anniversary of the Stockholm Environmental Conference, we would do well to remember the promise of the preamble to the Constitution. "In order to form a more perfect union," we took some steps to constitute a government. In 1787, we were thirteen colonies; standing alone, we couldn't make it. We were really thirteen separate sovereign states. We broke away from England and we were in the process of breaking away from one another. The wise men in Philadelphia two hundred years ago saw the necessity of sinking or swimming together. And, in order, to form a more perfect union, they adopted our Constitution.

On the earth, the Commission's report, it seems to me, points out that we need to think about forming a more perfect union. It will not be perfect, it will not mean the eradication of national sovereignty, probably not in our lifetime, anyway. But it should certainly bring a recognition that we are all in it together, that we will

ultimately sink or swim together. If we the people of this country pay attention to our forebears, if we, generations removed from those who formed a more perfect union understand what that meant and understand the necessity of preserving freedom now, we can put that light to the rest of the world and help them a great deal. And if we the people don't forget that, we Americans will be alright and so will the people of the rest of the world.

AWARD PRESENTATIONS

Citation: Robert O. Anderson

Robert O. Anderson, petroleum executive, rancher and civic leader, has been active in the oil industry since his graduation from the University of Chicago in 1939. His exploits in that field are well known, especially his creation of the Atlantic Richfield Oil Company into one of the giant enterprises of the world. Along with that he has established a reputation of knowledgeable support of the arts and humanities, memorialized in the recent establishment of the Robert O. Anderson Wing of the Los Angeles Museum of Modern Art and his chairmanship for more than twenty years of the Aspen Institute for Humanistic Studies.

But along with that, he has been in the forefront of those dedicated to the study and understanding of the world's ecology and to the establishment of institutional means of coping with environmental degradation, while at the same time supporting means of improving the economic well-being of humankind throughout the world.

It was Robert O. Anderson who founded the International Institute for Environment and Development in 1971. He has been its chairman ever since. Just four years ago, following the world industry conference on environmental management, he led in the establishment of the International Environmental Bureau, a special division of the International Chamber of Commerce.

For his exceptional leadership in the cause of sustainable development, for his ability to recruit and bring his peers in the world of business to cooperative action, for his ability to recognize and enhance the work of such innovators as Rene Dubos and Barbara Ward, as well as many others, the Environmental Regeneration Award is presented on behalf of The Rene Dubos Center for Human Environments to Robert Orville Anderson.

Acknowledgement: Robert O. Anderson

Twenty years ago I met Rachel Carson and I realized that this planet was not being properly cared for. In 1968, prior to the Stockholm meeting, I spoke to a UNESCO meeting in San Francisco. From that date on, I have been convinced that things are happening more rapidly than we can deal with them. The clock is ticking very, very fast. Fortunately, out of Stockholm came a realization that these problems are real. But we have not yet really started grappling with the problems. Acid rain -- there is no question that it has a major detrimental impact on the planet. The problems are enormous.

As I look back, I characterize it as one and a half billion people ago. That is literally how many people have been added to the planet since that 1968 conference in San Francisco. Stockholm was only one billion people ago. And population continues to outrun us. This is a vital race and no one understood it better than Rene Dubos; it is to his memory that we are here tonight. The Dubos Center continues to carry the light forward in this very important mission in life. It will go far beyond anyone in this room. It will affect not only us, but our children, our grandchildren and those beyond them.

We have an important mission, an important challenge and it cannot be done by fighting. It has to be done through education and cooperation at every level in our society. In accepting the Dubos award this evening I only hope that each of us can contribute in his or her own small way to this great effort. Thank you.

AWARD PRESENTATIONS

Citation: Gro Harlem Brundtland, Prime Minister of Norway

The Brundtland Commission was created in 1983 as an independent body by the United Nations to look ahead at critical problems and propose better ways and means for the world community to address them.

Mrs. Brundtland, Prime Minister of Norway, is Chairman of the World Commission on Environment and Development (also known as the Brundtland Commission). Mr. Jim MacNeill is Secretary General of the Commission.

Mrs. Brundtland is Leader of the Norwegian Labour Party and a Member of the Independent Commission on Disarmament and Security Issues. Mr. MacNeill came to the Commission from the Organization for Economic Cooperation and Development as Director of Environment.

Other commissioners are involved with the Only One Earth Forum both as Conveners and as Participants. In addition to Maurice Strong and William Ruckelshaus, two others are also present tonight: Margarita Marino de Botero from Colombia, and Ambassador Mohamed Sahnoun from Algeria.

Mrs. Brundtland stated the rationale for Our Common Future, the Commission's report, as follows: "There is an urgent need to fashion a long-term, integrated, global strategy for survival on this planet. We need a strategy for common survival and common security, a strategy for a common future."

On this historic occasion the International Environmental Regeneration Award is presented on behalf of the Rene Dubos Center for Human Environments for the first time to an organization, the World Commission on Environment and Development, headed by Mrs. Brundtland. To accept the award for the Commission is Mr. MacNeill.

Acknowledgement: Jim MacNeill

This is indeed a very great honor that you have bestowed on the Commission and it is on behalf of the Chairman, Prime Minister Brundtland of Norway, and the Vice-Chairman, Mansour Khalid of the Sudan, and all twenty-two members of the Commission that I accept it. Prime Minister Brundtland has asked me and I'm sure that all of the members of the Commission would wish me to express our deep appreciation to you and to the Rene Dubos Center for this great honor.

Several members of the Commission are here tonight and they, of course, share directly in this award. In addition, many others are here tonight who supported the work of the Commission from its inception. Some were special advisors or members of our various panels or committees, some helped us politically, and some helped us to secure the financial resources that we needed to do our work. Some of you appeared at some of our public hearings around the world and gave very freely of your time and wisdom to advise the Commission. I can't name you all, but you know who you are and you too should feel very much a part of this award.

As should thousands of other people from around the planet who are not here tonight, but who helped us in various ways. Many of these people appeared before our public hearings and gave very generously of their time and thought, often at great personal cost. In some situations, appearing before the Commission and saying what they said in public took real personal courage.

You will find their names in the report, some thirty pages of names closely typed at the end of the report. And you will also find their words expressed, sometimes in broken language, but full of meaning nonetheless, scattered in boxes throughout the report. These thousands of people from around the planet, scientists and slumdweller, political leaders and peasants, also share very much in this award tonight.

I would like also to mention the name of Barbara Ward here this evening. I had the great privilege of knowing Barbara Ward and of working with her over the years. We all see her as well as Rene Dubos as the main intellectual and spiritual source of many of the themes underlying the Commission's report.

Our public hearings were a hallmark of the Commission's open style and of the Commission's work. Through them we were exposed to insights and information that we would never have been able to tap using the standard controlled and safe methods of fact-finding that usually mark these bodies. In my opinion, it was these hearings more than anything else that made possible the most important political aspect of the report: the fact that it represents a consensus of all twenty-two commissioners from twenty-one countries, east and west, north and south.

The hearings gave the commissioners a special understanding of the issues and a shared basis of information and experience. After each hearing, I observed

commissioners with science or environmental backgrounds and those with development backgrounds moving closer to a shared interpretation of the issues.

The Commission is determined, as are many governments and NGOs, that this report will not be filed and forgotten like so many others. The issues of sustainable development and planetary survival are simply too urgent. They command action now, action leading to significant changes in many policies common to most countries and also changes in many of our institutional arrangements and our processes of decision-making, national and international.

Sustainable development is not a fixed state. It is a process of change and it will take time. But the last two weeks since we launched the report in London on April 27th indicate to me that the prospects for initiating a process of change on many of the things dealt with in the report are really very good. The launch in London was very successful with global media coverage, and the two ten part television series based on the issues in the report will both be shown in more than twenty countries this summer.

One message that comes through in the report above all others is that planetary survival and sustainable development depend upon a revitalization of the international ethic. The report begins with the phrase, "The earth is one, but the world is not," and the short overview at the beginning of the report is entitled, "From One Earth to One World." This message of an interdependent biosphere becoming totally interlocked with an interdependent world economy captures much of the philosophy underlying the report.

Listening to people in our public hearings in all parts of the world has convinced me that the end of the twentieth century will come to be seen as the time when the old trappings of sovereignty gave way to the new reality of our only one earth merging into our only one world, a world that in all its essential diversity will respect its essential unity. Thank you.

AWARD PRESENTATIONS

Citation: Mostafa K. Tolba

The Only One Earth Award is presented by The Rene Dubos Center every five years in commemoration of the Stockholm Conference. The award goes to an individual whose life's work has furthered the goals of Rene Dubos and Barbara Ward.

On this 15th Anniversary of that historic conference, the Only One Earth Award is presented to Mostafa Kamal Tolba, Executive Director of the United Nations Environment Programme (UNEP).

Dr. Mostafa Tolba, who holds the title of United Nations Under-Secretary General, is a noted botanist and environmentalist. A native of Egypt, he was appointed Executive Director of UNEP in 1976. He serves on the boards of various national and international scientific and technical societies and institutions.

At the Stockholm Conference he served as the leader of the Egyptian delegation and one of the Vice Presidents of the Conference. As Executive Director he has guided a series of original contributions in the fields of eco-development, cost-benefit analysis of environmental protection measures, environmental impact assessments and assessment of potential environmental risks.

Another marked contribution by Dr. Tolba in the last few years pertained to identification and presentation in a series of publications on emerging, critical environmental issues facing humanity.

Under his leadership, UNEP has also developed, in close cooperation with the organizations of the United Nations system, a set of guidelines in specific sectors of economic activity on assessing and minimizing the possible adverse environmental impacts of development activities.

Further evidence of his innovative leadership are his efforts in 1979 when UNEP, in cooperation with the U.N. Regional Commissions engaged in the important exercise of staging regional seminars on alternative patterns of development and life-styles.

Another important contribution by Dr. Tolba was his initiative in calling a World Conference on Industry and Environmental Management. This conference, which was held in Versailles in 1984, was the first of its kind and not only opened the way for industries and governments to explore common ground, but also

generated a new momentum within the corporate community and led to the formation of the International Environmental Bureau based in Geneva.

For his distinguished leadership in carrying out the goals and objectives of the Stockholm Conference; for his tireless endeavors as an environmental diplomat to maintain the global consensus on environmental protection; for his 'outreach strategy,' exemplified by the World Industry Conference on Environmental Management with its long-term agenda for follow-up action; for his initiatives and clear sense of timing in connection with the Mediterranean, desertification, and most recently, the international ozone agreement -- a dramatic success for UNEP -- that not only represented a rare display of international concern but also could pave the way for the much-needed talks on other pressing environmental problems in the future; and finally, for his continuing mission of helping the world develop the capacity for making the necessary choices for the care and maintenance of a small planet -- our Only One Earth -- the Only One Earth Award is presented on behalf of The Rene Dubos Center for Human Environments to Mostafa Kamal Tolba.

PRE-FORUM ACTIVITIES

Pre-forum activities carried out by the Dubos Center responded to the need to assess environmental progress on key issues, including those that emerged over the 15 years since the historic Stockholm Conference. In addition to the work of the World Commission on Environment and Development, selected global reports were reviewed and the list is included as Appendix III a.

In addition, the Committee of Conveners, the Forum Steering Committee, and all of the participants were asked prior to the Forum to assess the progress by answering two key questions: (1) What has been the most significant environmental achievements since Stockholm? and (2) What do you believe to be the most worrisome developments? The results of that survey are included as Appendix III b.

Background papers requested for the Forum summarized and documented illustrative achievements since Stockholm by individuals and organizations, both governmental and nongovernmental, from both developing and developed countries and the papers are listed in Appendix III c.

Finally, an annotated bibliography of books, publications of organizations, unpublished materials, and periodical articles was prepared for the Forum by Peggy Tsukahira (Appendix III d). A free-lance science editor, Ms. Tsukahira edited Celebrations of Life by Rene Dubos (McGraw-Hill, 1982). The Dubos Center is indebted to Ms. Tsukahira for her invaluable contributions of time and expertise and especially for her continuing interest in its social and environmental philosophy.

Karen Morrell, an intern and scholar, prepared the annotated bibliography that involved reviewing selected journals and magazines (Appendix III e). The Rene Dubos Center remains very grateful to Ms. Morrell for her important contribution.

The opinions expressed in the appended annotated bibliographies do not necessarily reflect the views of the Dubos Center.

PRE-FORUM ACTIVITIES

Selected World Reports

Annual Report of the Executive Director (1984) -- UNEP

Building a Sustainable Society (1981) -- Lester R. Brown

Down to Earth (1982) -- Erik P. Eckholm

An Environmental Agenda for the Future (1985) -- John Adams et. al.

Environmental Quality (1984) -- Ch. 11 (International Environmental Issues), 15th Annual Report of the Council on Environmental Quality

From One Earth to One World (An Overview by the World Commission on Environment and Development) (1987) -- WCED

The Global Possible: Resources, Development, and the New Century (1984) -- World Resources Institute (WRI)

Land for Human Settlements (1983) -- United Nations Centre for Human Settlements

Mandate for Change (1985) -- WCED

Our Common Future (1987) -- WCED

Perspective (1987) -- UNEP's Intergovernmental Inter-sessional Committee on the Environmental Perspective (IIPC)

Six Steps to a Sustainable Society (1982) -- Worldwatch Institute

The State of the Environment (1985) (1984) -- UNEP

State of the World (1987) (1986) (1985) (1984) -- Worldwatch Institute

Stockholm Plus Ten (1982) -- Earthscan, IIED

Sustainable Development and How to Achieve It (1986) -- Global Tomorrow Coalition

World Bank Lending for Urban Development, 1972-1982 (1983) -- The World Bank

World Conservation Strategy (1980) -- IUCN, UNEP, WWF, FAO, UNESCO Updated (1986)

World Development Report (1986) -- The World Bank

World Enough and Time (1986) -- Robert Repetto

The World Environment (1972-82) -- UNEP

World Industry Conference on Environmental Management [WICEM] Outcome and Reactions (1984) -- UNEP

World Resources Report (1987) (1986) -- IIED, WRI

PRE-FORUM ACTIVITIES

Responses to Key Questions

(1) WHAT IN YOUR OPINION HAVE BEEN THE MOST SIGNIFICANT ENVIRONMENTAL ACHIEVEMENTS IN THE PAST 15 YEARS?

| <u>Response</u> | <u>Percent Responding</u> |
|---|---------------------------|
| 1. increased environmental awareness/ global outlook | 48 |
| 2. legislative framework/more regulatory policies and agencies | 25 |
| 3. improvements in water quality (point source, oceans) | 25 |
| 4. trend towards international cooperation | 23 |
| 5. increased public involvement/grassroots movements/environmental organizations | 20 |
| 6. data and technical advances for dealing with environmental problems | 18 |
| 7. recognition of need for sustainable development | 11 |
| 8. air quality improvements | 11 |
| 9. efforts by industry in reducing impact | 9 |
| 10. forest conservation efforts | 7 |
| 11. protection of endangered/threatened species | 7 |
| 12. knowledge in envir. health -- research on toxics | 7 |
| 13. population stabilization (e.g. China, Latin America) | 7 |
| 14. energy conservation efforts | 5 |

15. increased knowledge of the effects of nuclear war 2
16. increased capacity to meet world's food needs 2
17. decreased tobacco use 2
18. establishment of UNEP 2
19. World Bank's hiring of 100 environmentalists 2
20. Third World holistic thinking 2

(2) WHAT DO YOU CONSIDER THE MOST WOR-
RISOME ENVIRONMENTAL DEVELOPMENTS SINCE
THE STOCKHOLM CONFERENCE?

| <u>Response</u> | <u>Percent Responding</u> |
|--|---------------------------|
| 1. poverty/population/resource depletion | 39 |
| 2. atmospheric pollution (ozone depletion, acid rain, greenhouse effect) | 30 |
| 3. deforestation/desertification | 27 |
| 4. proliferation of hazardous substances (nuclear waste, ,toxics, etc.) | 23 |
| 5. proliferation of nuclear weapons | 16 |
| 6. general neglect of envir./lack of global outlook | 14 |
| 7. groundwater contamination | 11 |
| 8. absence of international regulations/agencies and lack of planning | 9 |
| 9. deterioration of African environment | 9 |
| 10. industrial exploitation of our environment | 7 |
| 11. species extinction | 7 |
| 12. widening economic gap (on both a national and individual level) | 7 |
| 13. more urbanization - alienation from nature | 7 |
| 14. settlements/development problems/cities | 7 |
| 15. failure to apply our knowledge of/to the environment | 7 |
| 16. disease (AIDS) | 7 |
| 17. continued reliance on non-renewable energy | 7 |
| 18. lack of structural accountability for supra-natural disasters | 5 |

| | |
|--|---|
| 19. over-reaction by public (to alleged dangers) | 5 |
| 20. ocean pollution | 2 |
| 21. decline in U.S. leadership role | 2 |
| 22. over regulation of industry | 2 |
| 23. underfunding of research in environmental health | 2 |
| 24. impact of animal rights movement on renewable resource economy | 2 |

Responses to Key Questions

Significant Achievements

The overwhelming response to the question on the most significant achievements in the last 15 years was a very general one, which seemed to encompass many different perspectives and issues: respondents felt that there has been **an increased environmental awareness and global outlook by the public at large and a greater tendency for policy makers to consider the environment when making major decisions.**

"...environmental factors have been institutionalized in environmental regulations, environmental impact assessment, international agreements, the multiplication of NGOs dealing with the environment..."

"...identification of planetary and biospheric sustainability as the goal of environmental concern."

"...the consciousness of men and governments, that nature has to be protected at the risk of destruction of ourselves."

"... a monumental increase in awareness to deal with these issues at every level of society, from citizens to governments."

Some respondents saw this environmental recognition as greater or more significant in industrialized countries, noting such industrial hazards as air and water pollution, hazardous wastes and global atmospheric trends (ozone problems, greenhouse effect, etc.).

Others viewed this renaissance as more significant in the developing world, noting such developmental traps as forest and resource depletion, land degradation, and recognizing the need for sustainable environmental and economic development:

"This socio-political achievement is significant because it lays the groundwork necessary for the implementation of sustainable development strategies."

This increase in worldwide environmental awareness since Stockholm was certainly the major theme of our survey. Most respondents mentioned other, more specific achievements for which this awareness was responsible and in which it was manifested.

The most prevalent specific achievement mentioned by the respondents was the **improvement in water quality**. Some referred to cleanup of the worlds' oceans, international cooperation in terms of shared waters and the Law of the Sea Treaty. Other responses focused upon point-source improvement and U.S. waters, specifically the Great Lakes and Lake Erie.

Another very prevalent response, related to the first, was the **increasing trend towards international cooperation in dealing with environmental problems**. Specifically, governments are now cooperating with international agreements concerning the cleanup and protection of international waters, banning trade of endangered and threatened species, regulating chlorofluorocarbons, and ozone protection; some mentioned the establishment of UNEP; and one mentioned, "Information exchange and related activities...such as the Global Environmental Monitoring System."

This leads us to another popular response, data and **technical advances for dealing with environmental problems**, mentioned by the participants. Specific advances mentioned were: cost-effective pollution control measures; scientific advances in agriculture -- crops, fertilizer and soil mixture; mapping and planning technology; "development of comprehensive, sophisticated toxicology testing capabilities, to determine the health effects of both natural and synthetic chemicals"; "the series of geostationary and Earth-orbiting satellites making it possible to monitor changes in soils, vegetation, crops and human settlements at regional, continental and inter-continental scales."

Respondents also mentioned:

the establishment of more regulatory policies, agencies and environmentally-oriented NGOs. These are important because they have proliferated information dissemination, regulatory and monitoring activity, initiatives and impact assessment. Mentioned specifically were UNEP and the U.S. EPA.

improvements in air quality. General air quality in industrialized countries received the major thrust, while specifics such as international regulations on chlorofluorocarbons, and recognition of the global warming trend, were also given.

increased awareness of the dangers and health effects of toxic chemicals and hazardous substances. This includes the establishment of the National Toxicology Program, their Annual report on Carcinogens, the National Institute of Environmental Health Sciences Research Centers, and various other research programs in environmental health.

sustainable development -- "growing recognition of the symbiotic relationship between environment and development". As one participant stated, "There is an increasing acceptance by Third World Leaders of the need for population control, sustainable development, resource use, environmental quality, etc."

increased efforts at cooperation, as opposed to confrontation: "the gradual -- all too gradual, but nonetheless welcome -- movement away from confrontation and toward dialogue between environmental leaders and corporate leaders in recognition of their shared stake in the preservation of healthy and productive natural systems worldwide."

Other responses included:

- **efforts by industry to reduce impact/pollution**
- **forest conservation and anti-desertification efforts**
- **protection of endangered and threatened species**
- **population stabilization, e.g. China**
- **energy conservation efforts**
- **increased capacity to meet the world's food needs**
- **increased knowledge of the effects of nuclear war**
- **decreased tobacco use**

Responses to Key Questions

Worrisome Developments

The most prevalent response to the question on the most worrisome developments since Stockholm was the trifold environmental dilemma of **population growth**, resulting in **widespread poverty** and **massive resource depletion in developing countries**. Although some of the respondents did not mention all three of these difficulties together, their interconnectedness was always implied.

"...inadequate steps to solve poverty-related problems of protecting human health and natural resources."

"These problems may grow more difficult as the planetary population continues to double before finally leveling off, and the resultant pressure on a limited resource base, especially by societies whose lack of economic leverage forces them to 'live off the land' destructively, carry a risk of increased international conflict and instability of governance."

"...the accelerated decline of the natural resource base in many developing nations."

"...lack of financial and human resources in governments of most developing countries to deal with mounting environmental problems."

The difficulties of **atmospheric pollution** also generated a lot of concern. This includes the problems of ozone depletion, the global warming trend, acid rain, and atmospheric carcinogens. One participant cited "...an apparent inability to control at national and international levels the industrial pollutants contributing to acid rain, ozone depletion, and the Greenhouse effect."

The proliferation of hazardous and toxic substances, including nuclear waste and toxic chemicals (DDT), were another strong concern. As one participant stated, "...the pervasiveness of chemicals in the food we eat, the air we breath, in our homes and workplaces is a major environmental problem because of the cumulative risks it poses to human health. Our ability to detect and analyze increasingly minute concentrations of environmental contaminants, man-made chemicals in particular, is turning an environmental problem into a public health problem."

One toxic expert noted, "The fact that we still have not been able to come up with anything better than the Ames test for the screening of the large number of possible dangerous chemicals in our environment -- the Ames test is good for only about 50-70% ...we do not have the capacity to keep up with the inventiveness of the chemists and we fall further behind each year."

The **proliferation of nuclear weapons** generated perhaps the most emotional and urgent responses in the survey with comments such as, "...the continued reliance of most nations upon the development of, the testing of and the threatening to use more and more efficient means to kill people and the entire ecosphere with nuclear, biological and chemical weapons. The reliance upon mutually assured destruction must be replaced with mutually assured protection politics. Let's get serious about peace, not just the absence of major, global war."

Groundwater pollution was another major concern, mentioned by the respondents. The concern was described by one participant as, "The growing evidence that our surface and groundwaters are becoming increasingly contaminated with many new and exotic organic compounds that are or may be chronically toxic."

Despite what some responded to our first key question, a fair number of respondents felt that of major concern is the **lack of global outlook** -- "continued ideological blinders, i.e. global predicament."

The **widening economic gap**, between both nations and individuals was another problem noted. This is viewed as a major problem because it "causes friction at many levels" and it "increases the difficulty in forging common approaches to international problems."

One repercussion of the population growth problem is that of **cities and human settlements**. "...the lack of progress with respect to issues of housing, shelter and the environment of large cities." It is difficult both for governments in dealing with the demands of the population densities of large cities, and for our environment, which has difficulties absorbing the heavy pollutions and wastes which these cities generate."

Another aspect of the poverty/population problem is that of **disease and famine**. Specified in the responses were **water born diseases and AIDS**.

In testimony to the diversity of our participants, the corporate opinion was voiced by two who felt that **the over-reaction by the public to alleged dangers** was one of the biggest environmental concerns of the past fifteen years. They commented about "the politicizing of the degree and nature of environmental hazards," and "...a widespread fear of often unknown toxics and environmental hazards. This frequently leads to public paranoia, fostered by the media, politicians and some public interest groups."

An overlapping concern was "the over-regulation of industry...with significant duplication of testing and analytical requirements, unnecessary facility and process modifications and the required implementation of very costly physical controls which cannot be supported through scientific risk assessments."

The romantic/naturalist opinion was likewise expressed by one who was rather concerned about the **crisis of environmental alienation**. His plea was that: "...since Stockholm 1972, a dramatically larger number and proportion of the world's people have been alienated from the natural world. This is the result of: 1) urbanization; 2) the impoverishment of the creation; 3) and the conceptual transformation of the long-standing interest of all people in the creation into a 'special interest.'"

Other responses included:

- **species extinction / loss of biological diversity**

- **continued reliance upon non-renewable energy (including nuclear energy)**

- **absence of / inability to establish international regulations on emissions and other environmental matters**

- **general inability to convert our environmental knowledge and concern into practical achievements**

- **ocean and surface water pollution**

- **increasing industrial exploitation of our world**

- **"the chronic underfunding of research efforts in environmental health"**

- **"the lack of structural accountability for supra-national disasters (i.e. Chernobyl; German and Swiss chemical spills)"**

Perhaps the most interesting aspect of our survey was that many subjects were mentioned as both significant achievements and as worrisome developments in the past fifteen years. Among these were: global outlook, air pollution, water pollution, endangered species, international cooperation, population trends, etc. This phenomenon proves that, although the achievements and the progress that has been made since Stockholm are very noteworthy and significant and should be a source of pride and inspiration for all those involved, these achievements are only the beginning. They are both a reminder that much remains to be done, and also a stepping stone towards and a sign of hope for further progress and the realization of a **truly global outlook**.

PRE-FORUM ACTIVITIES

Background Papers

(WORKSHOP I)

Africa's Current Crisis and The Urban Condition

Tade Akin Aina, Associate Professor of Anthropology, University of Lagos, Nigeria

Natural Resource and Environmental Issues in Sub-Saharan Africa - A World Bank Perspective

Edward V. K. Jaycox, Vice President, Eastern and Southern Africa Region, World Bank, Washington

Recent, Present and Future Programs of the Catholic Relief Services in Africa

Thomas Mulhearn, Deputy Director for Africa, Catholic Relief Services, New York

The Village Video Network: Video As A Tool for Local Development and South-to-South Exchange

Sara Stuart, President, Martha Stuart Communications, New York

(WORKSHOP II)

Planning A Revolution in Nuclear Power Technology

Joseph R. Egan, Attorney At Law, LeBoeuf, Lamb, Leiby & MacRae
New York

Advanced Waste Management Systems: Perspectives of A Small Company

Richard Ellis, Chairman, Advanced Waste Management Systems,
Tennessee

The Role of Business and Industry in Managing Hazardous Substances

Fred Hoerger, Regulatory and Policy Consultant, Health and Environmental Sciences, The Dow Chemical Company,
Michigan

Background on the Institute of Nuclear Power Operations

Angie Howard, Vice President of Communications, Institute of Nuclear Power Operations, Georgia

A Global View of Hazardous Waste Management in the Eighties

Jan Ingwersen, Vice President, Chemcontrol, New Jersey

Regulating Toxic Chemicals in the Environment

Lester B. Lave, Professor of Economics, Graduate School of Industrial Administration, Carnegie-Mellon University, Pennsylvania

Arthur C. Upton, Professor and Chairman, Institute of Environmental Medicine, New York University

The Institute for Local Self-Reliance

Lawrence R. Martin, Director, Hazardous Waste Minimization Project, Institute for Local Self-Reliance, Washington, D.C.

Practical Lessons in Risk Communications

Maria Pavlova, National Expert on Toxicology, Environmental Protection Agency, Region 2 Office, New York

National Institute of Environmental Health Sciences: A Progress Report

David P. Rall, Director, NIEHS, North Carolina

(WORKSHOP III)

Framework for A Northwest Territories Conservation Strategy

Jamie Bastedo, Policy and Planning Division, Department of Renewable Resources, Government of the Northwest Territories, Canada

A Sustainable Earth: Religion and Ecology in the Western Hemisphere

Calvin DeWitt, Vice Chairman, North American Conference on Christianity and Ecology, Wisconsin

The Development and Use of the "Environmental Quality Index": A Potential Model for Environmental Assessment in Other Nations

Benjamin C. Dysart, III, Past President and Chairman of the Board, National Wildlife Federation, Washington, D.C.

A Strategy for Combatting Environmental Imbalance

Mads Faegteborg, Secretary of Inuit Circumpolar Conference
Environmental Commission, Denmark

The North American Conference on Christianity and Ecology

Albert J. Fritsch, Chairman, Board of Directors, The North
American Conference on Christianity and Ecology, Califor-
nia

The International Center for the Solution of Environmental Problems (ICSEP) Sustained Agricultural Ecology

Joseph L. Goldman, Technical Director, ICSEP, Texas

A Discussion of Ethics Which Support A Conservation Policy for Tennessee

Charles A. Howell, III, President, Trust For The Future, Tennessee

From Stockholm to the Garden of Eden: Only One Earth

Peter D. Jacobs, Chairman, International Union on Conservation and
Natural Resources Commission on Environmental
Planning, University of Montreal, Canada

Guanacaste National Park: Tropical Ecological and Biocultural Restoration

Daniel H. Janzen, Professor of Biology, University of Pennsylvania

Animal Protection Movements and the Aboriginal Life-Style

Towards An Inuit Regional Conservation Strategy

Finn Lynge, Coordinator of Inuit Circumpolar Conference
Environmental Commission, Denmark

State of the Environment Reporting

Darrell Piekarz, State of the Environment Specialist,
Environmental Analysis Branch, Environment Canada

Conservation Strategy Initiatives in the Yukon

David B. Porter, Minister of Renewable Resources, Government of
the Yukon, Canada

Regenerating Our Agriculture

Robert Rodale, Chairman, Rodale Press, Pennsylvania

(WORKSHOP IV)

The Centro de Estudios del Habitat Popular (CEHAP)

Reflexions on Popular Habitat Processes in Colombia

Maria Clara Echeverria, Directress, Centro de Estudios del Habitat Popular, Colombia

Habitat for Humanity: History, Present Activities and Future Plans

Millard D. Fuller, Founder and Executive Director, Habitat for Humanity, Georgia

Urban Infrastructure: Targeting The Poor Has Come and Gone Since Stockholm

Ralph Gakenheimer, Professor of City & Regional Planning, Massachusetts Institute of Technology

Resources for The Improvement of The Quality of Life in The Human Settlements of The Third World

Jorge E. Hardoy, Director, Latin American Office, International Institute for Environment and Development, Argentina

Housing and Health: Do Architects and Planners Have A Role?

Jorge E. Hardoy, Director, Latin American Office, International Institute for Environment and Development, Argentina
David Satterthwaite, Human Settlements Programme, International Institute for Environment and Development, London

Land Acquisition and Improvement for Development

Richard May, Jr., Chairman, International Division, American Planning Association, New York

The Urban Transition in Asia: The Emergence of New Regions of Economic Interaction in Asia

Terence G. McGee, Professor of Geography and Director, Institute of Asian Research, University of British Columbia, Canada

The International Year of Shelter for The Homeless

Peter R. Smith, President, Canadian Conference to Observe The International Year of Shelter for The Homeless

Responses to Urbanization

Narelle Ray Townsend, Human Settlements Officer, Economic and Social Commission for Asia and the Pacific

(WORKSHOP V)

Origins, Development and Aims of the World Environment Center

Whitman Bassow, President, World Environment Center, New York

Environmental Services of The International Association of Lions Clubs

Robert J. Cywinski, Manager, Program Development Department,
The International Association of Lions Clubs, Illinois

The Main Contributions of The Population Council

Paul Demeny, Director, Center for Policy Studies, The Population
Council, New York

The Synergos Institute

Peggy Dulany, President, The Synergos Institute, New York

History, Present Activities and Future Plans of TRANET

The Environment/Economy Nexus: The Heritage from Stockholm 1972

William Ellis, Executive Director, Transnational Network for
Appropriate/Alternative Technology (TRANET), Maine

Past, Present and Future Programs of The Academy of Arts and Sciences of the Americas

Julia Allen Field, President, Academy of Arts and Sciences of the
Americas, Florida

Reflections on Implementing Principles and Strategies for Action on Managing Our Complex Global Environment

Highlights of Activities by the Scientific Committee on Problems of the Environment (SCOPE) of the International Council of Scientific Unions (ICSU)

Thomas F. Malone, Scholar in Residence, St. Joseph College,
Connecticut, and Former Secretary General of SCOPE

Colombia's Green Campaign

Margarita Marino de Botero, Former Director-General, National
Institute of Renewable Natural Resources and the
Environment, Colombia

History of the American College of Toxicology

Myron A. Mehlman, Director of Toxicology Division, Environmental
Affairs and Toxicology Department, Mobil Oil Corporation

ANNOTATED BIBLIOGRAPHY

Peggy Tsukahira

typ = typescript

WCED = World Commission on Environment and Development

- **** outstanding
- *** widely useful
- ** for experts
- * of limited usefulness

Categories:

- Books
- Publications of Organizations
- Unpublished Materials
- Periodicals

BOOKS

****Adams, John et al: AN ENVIRONMENTAL AGENDA FOR THE FUTURE** (Washington, D.C.: Island Press, 1985) 55 pp.

Developed by the chief executives of ten major US environmental and conservation organizations, these recommendations are tailored to the state of environmental regulation in the U.S. An overall corrective for the flaws in existing legislation and enforcement. However, recommendations are stated in fairly general terms; many simply call for existing agencies to do their jobs better and with more dispatch. Low-key tone conveys little sense of urgency.

******Berger, John J: RESTORING THE EARTH: How Americans Are Working to Renew Our Damaged Environment** (New York, N.Y.: Viking, 1985) 241 pp.

Well-written accounts of spectacular successes along with some still tense stand-offs. Includes founding of model ecologically-sound community; replanting of prairie; restoring of polluted waterways; etc., mostly through efforts of one or two persistent individuals. Vivid examples of human strengths, weaknesses, and group behavior. Inspires ideas and action.

****Brown, Lester: BUILDING A SUSTAINABLE SOCIETY** (New York, N.Y.: W.W. Norton & Co., 1981) 433 pp.

Rather conventional round-up of environmental problems, followed by good description of the "shape" of a sustainable society and how to make the transition to it. Main thrust is U.S. and First World, but many references to developing nations.

****Brown, Lester et al: STATE OF THE WORLD, 1986: A Worldwatch Institute Report on Progress Toward a Sustainable Society (New York, N.Y.: W.W. Norton & Co., 1986) 263 pp.**

A collection of papers on an important, if not a comprehensive, list of topics. Quality varies by author. Topics include the plight of African children and decommissioning nuclear power plants. Useful more as an anthology of specific topics than as an overall "state of the world" report.

*****Doyle, Jack: ALTERED HARVEST: Agriculture, Genetics, and the Fate of the World's Food Supply (New York, N.Y.: Viking, 1985) 502 pp.**

About the "coupling of genetic power with corporate power." Author's thesis is that "centralization of the components of food production in fewer corporations and government hands increases the vulnerability of the food system to agricultural, political, and economic crises." Strong anti-corporate bias; tone of expose; few constructive recommendations for remedying the situation. Doom-and-gloom scenario with corporations as greedy villains. Many examples and anecdotes; much interesting information about the sophistication of agribusiness in plant genetics. A bit repetitive; would have been better if condensed.

*****Huisingh, et al: PROVEN PROFITS FROM POLLUTION PREVENTION: Case Studies in Resource Conservation and Waste Reduction (Washington, D.C.: Institute for Local Self-Reliance, 1986) 316 pp.**

Excellent collection of case studies based on data gathered by questionnaire and presented in tabular form with brief accompanying descriptions. Individual businesses and plants report savings of time, energy, money, personnel through specific uses of resource recycling, waste minimization, pollution prevention.

*****Repetto, Robert: WORLD ENOUGH AND TIME: Successful Strategies for Resource Management (New Haven: Yale University Press, 1986) 147 pp.**

Calm, succinct, unemotional summary of latest thinking in global environmental management. Complete coverage, sound strategies.

PUBLICATIONS OF ORGANIZATIONS

***Environment Canada and Statistics Canada: STATE OF THE ENVIRONMENT REPORT FOR CANADA** (Hull, Quebec: Canadian Gov't Publishing Centre, 1986) 263 pp.

Exhaustive measurements and statistics on the Canadian environment are compiled and well organized in tabular form. Many other helpful graphics, maps, etc. But conclusions about data are vague. Clearly stated guidelines for interpreting the mass of information would have greatly extended the book's usefulness.

*****Environment Canada: CANADA'S ENVIRONMENT: An Overview** (Ottawa: Environment Canada, 1986) 20 pp.

An excellent summary of the State of Environment Report for Canada (above) with the same arresting graphics and the addition of unequivocal conclusions.

****Environment Liaison Centre: NGOS AND ENVIRONMENT-DEVELOPMENT ISSUES**, Henri Roggeri, ed. (Nairobi: ELC Jan. 1986) 77 pp. typ for WCED

The decade 1975-85 saw great increase in number and variety of NGOs worldwide facing the chief issue of integrating development and environment. Outreach, identification of problems, regional networking have all been successful, making chief failure all the more painful: the inability of grassroots NGOs to communicate their needs or their findings to larger institutions and sources of funds. Academic style of paper does not conceal authors' anguish at this failure and anger at ignorance and paternalism of donor institutions.

******Clarke, Robin and Timberlake, Lloyd: STOCKHOLM PLUS TEN: PROMISES, PROMISES? The Decade Since the 1972 U.N. Environment Conference** (London: Earthscan, 1982) 74pp.

Highly useful, cogent overview of worldwide environmental activity since Stockholm, specifically reviewing measures called for at that conference and what progress, if any, has been made. Rates 6 key UNEP documents relating to this decade. Format of bulleted lists and underlined key phrases very easy to scan.

******Conservation Foundation: CHEMICAL POLICY IN THE GLOBAL ENVIRONMENT** (Wash. D. C.: Conservation Foundation, Feb. 1986) typ for WCED 109pp.

Excellent (though dry) 12-page Executive Summary at beginning of paper lists recommendations in areas of data development, data sharing, broadening data use, integrating assessments of "old" and new chemicals, and dealing with pollution. The general recommendations in this paper will be familiar to interested lay readers (e.g., a call for international policy on testing new chemicals), but the more specific and technical suggestions are enlightening. Points out problem areas, such as separation of programs for old and new chemicals; how to categorize chemicals (by structure? function/application? mode of entering body or environment?)

******Francis, Charles A. and Richard A. Harwood: ENOUGH FOOD; ACHIEVING FOOD SECURITY THROUGH REGENERATIVE AGRICULTURE** (Emmaus, PA: Rodale Institute, 1985) 20pp.

Excellent summary and overview of basic requirements of a good, self-sustaining agricultural system. Can virtually be used as a blueprint for either a single farm's or an entire nation's agricultural policy. Information on sun, soil, water, energy, human management, pest and disease control is so well organized and simply stated that it is convincing in itself.

******Global Tomorrow Coalition: SUSTAINABLE DEVELOPMENT AND HOW TO ACHIEVE IT** (Wash. D. C.: May 1986) type for WCED 44pp.

Synthesized from the responses of many nongovernmental organizations to the WCED's request for comments on the relationship between environment and development, this is an admirably complete, well reasoned, straightforward interpretation of the popular but often loosely used concept, sustainable development. Their fine definition of the term begins, "A process of change to meet the needs of people as defined by them..." The report covers the gamut of issues from community based development to the role of women to biological diversity to global focus. The report constitutes a model of the Dubos motto, "Think globally, act locally." The proposed solutions seem so eminently sensible that hope rises as one reads. One might wish only for a tone that were a touch more urgent and persuasive that these recommendations might get the full attention they deserve.

******International Development Research Center: WITH OUR OWN HANDS: Research for Third World Development: Canada's Contribution through the IDRC 1970-85** (Ottawa: IDRC, 1986) 206pp.

A modest Title for one of the most heartening 15-year record of concrete, positive achievements from any organization to appear in 1986. The Canadian organization, IDRC claims independence from political pressures and focusses faithfully on funding applied practical research designed to benefit the poorest people in a given developing nation. The various reports in this collection, written by those

with first-hand experience with the projects, are likewise free of academic posturing or impassioned editorializing, and recount in simple, thoughtful style the projects' purpose, methodology, and results both tangible and intangible. The reader is thus treated to vivid impressions as well as understanding of situations ranging from improving a metal cookstove in Kenya to evaluating elementary school teachers in Cairo to introducing oral rehydration therapy for infants in the Philippines. A model for First World funding institutions and outreach programs purporting to serve the Third World.

****International Labor Organization and Institute of Social Studies: THE RURAL ENERGY CRISIS; WOMEN'S WORK AND BASIC NEEDS, International Workshop Proceedings (The Hague: ILO & ISS, 21-24 April 1986) typ 79pp.**

Workshop attended by representatives of women in Africa, Asia, and Latin America, along with experts in various policy-making and technological fields, convened to discuss how deteriorating environment and reduced biomass fuel affects rural women's ability to support their families. "Comon to all three third world areas was the interdependence of people, livestock, land, and forest. Chief value of workshop reported to be the communication among the participants. Among recommendations of workshop were that NGOs be more active as liaison between local women and the governing establishment; and that funding sources develop a financial package that would cover training, credit, advice, education, and market studies for a given locality.

***International Union for Conservation of Nature and Natural Resources: WORLD CONSERVATION STRATEGY: Living Resource Conservation for Sustainable Development (Gland, Switzerland, 1980)**

Many obvious generalizations ("policies and decisions should be implemented") with only a few ideas for specific action. With every recommendation presented as a "Should," this is tedious reading. The unrelentingly logical analysis seems to take little account of national, cultural, and individual human behavior and history. Best section in this three-part report: maps.

****Institute for Local Self Reliance: TOWARD POLLUTION-FREE MANUFACTURING (New York: American Management Assoc.,1986) 122pp.**

Beginning with a chatty, magazine-style introduction about manufacturers' problems with environmental regulation and a Q&A format interview with Lee Thomas, EPA Administrator, this booklet then presents in a readable style many of the case histories from PROVEN PROFITS FROM POLLUTION PREVENTION, organized by type of industry. No doubt intended for a wider business audience via the AMA, this delivers information to readers who prefer narrative to summary reports.

******Pearson, Charles S.: DOWN TO BUSINESS: Multinational Corporations, the Environment, and Development** (Wash. D.C., World Resources Inst., Jan. 1985) 107pp.

Issuing from a two-year study by WRI of MNCs, this excellent report by the study's director succinctly analyzes all aspects of reconciling economic development with environmental quality--a key issue with MNCs. Author notes the dramatic shift in attitudes from mutual suspicion to cooperation among former antagonists, such as those between developed and undeveloped nations, corporations and host nations, environmentalists and developing nations. He punctures some myths about MNCs as bad guys and calls for basing standards and policy on an accurate cost/benefit basis. An excellent aid to clear thinking on the subject.

****Repetto, Robert: CREATING INCENTIVES FOR SUSTAINABLE FOREST DEVELOPMENT** (Washington, D.C., D.C: World Resources Institute 12/85) 41pp.

Does not live up to its title; few, if any recommendations for good incentives given. A wide variety of existing incentives designed to aid economic development that have caused rapid deforestation and economic loss are described and examples given. The encouraging statement that there is ample hope and opportunity to turn the situation around is unfortunately not discussed further.

****-----: PAYING THE PRICE: Pesticide Subsidies in Developing Countries** (Washington, D.C.: World Resources Institute, 12/85) 27pp.

Raises likelihood, supported with many examples, that pesticide subsidies are harmful to the nation's economy and environment, but concludes only that not enough information is available to draw firm conclusions. Useful statistics and country-by-country summaries of pesticide subsidies in 9 nations.

*****3M Company: LOW- OR NON-POLLUTION TECHNOLOGY THROUGH POLLUTION PREVENTION** (St. Paul, MI: 3M Co. for U.N. Environment Program, c.1982) 35 pp.

Environmentally enlightened industry at nearly its best. Although written from business' point of view, this is a clear, practical analysis of the topic that respects both technology and human hurdles to introducing environmentally sound technology in heavy industry. Presents well-argued gripes against certain aspects of regulation, but also acknowledges its efficacy in inducing industry to comply with pollution prevention practices. Although focussed on the industrial world, the report's emphasis on including pollution prevention technology in the planning stage of new plants is applicable to the developing world.

***United Nations Centre on Transnational Corporations: ENVIRONMENTAL ASPECTS OF THE ACTIVITIES OF TRANSNATIONAL CORPORATIONS: A Survey** (New York, N.Y.: United Nations, 1985) 113pp.

Hard going through wordy exposition (exception: description of Seveso incident in appendix) to get at the information, which seems to be quite extensive and culled from many sources. Difficult to see the big picture here. General thrust seems to be that the TNCs are not behaving as badly as the public perceives, e.g., that polluting industries are not increasing foreign investment compared to others; that "pollution havens" are not distorting the international pattern of investment; etc. Conclusions are bland or nonexistent; recommendations are largely calls for further study.

******World Commission on Environment and Development: FROM ONE EARTH TO ONE WORLD** (Geneva: WCED, April 27, 1987) typ 34pp.

Outstanding summary of the landmark WCED report on the global environment. Almost poetic at times in its clarity and conciseness, the summary observes that "the earth is one, but the world is not," and identifies the crux of most of the world's problems: "Many present development trends leave increasing numbers of people poor and vulnerable while at the same time degrading the environment." From this wisdom arise the definitions of, approaches to, and specific recommendations for redressing the full range of interrelated man-made ills that plague the globe and all its life forms. Global perspective places no onus on any one group of nations for the state of affairs; emphasis on common vital interest. Gives chief points from full report except for institutional and legal recommendations.

******-----: OUR COMMON FUTURE** (Geneva: WCED, April 27, 1987) approx 250 pp typ

Landmark report on the global environment, beginning with excellent summary (see above). Following a definition of sustainable development and a discussion of the role of international economy in either promoting or blocking it, the superbly organized report presents six areas of crucial concern in which the nature of our developmental schemes must change from destructive and impoverishing to healthy and sustainable: population and human resources; food security; species and ecosystems; energy; industry; and urbanization. Last section deals with the "global commons" -- oceans, space, Antarctica --peace; and institutional and legal change. Recommendations are specific and forthrightly stated. Certain common themes thread recommendations that were not generally recognized at the beginning of the environmental movement, e.g., that, economics influence policies and possibilities; that, because the earth is one, all sectors of society are interdependent and that environmental awareness should be obtained in all endeavors; that prevention is better than react-and cure; that the people directly affected by a situation should lead the policy planning and implementation addressing that situation.

This report should furnish a blueprint for social and environmental action for at least the rest of the century.

******World Commission on Environment and Development: FOOD SECURITY: Report of the Advisory Panel on Food Security, Agriculture, Forestry, And Environment (Geneva: WCED, 1986) typ 55 pp plus tables**

[This report is a contributor to WCED's OUR COMMON FUTURE, above.] Energetic, intelligent, impassioned paper advocates making sustainable livelihood security for the poor the basis and top priority of all environmental planning. Takes this theme through discussion of major environmental areas in both developed and environmental countries -- land yield, deforestation, desertification, water management, population issues, agricultural policy. Observes astutely, "We know what needs to be done, but not how it can be done." Offers a 7-point action plan as an answer to "How."

*****World Commission on Environment and Development: ENERGY: Report of the Advisory Panel on Energy and Sustainable Development (Geneva: WCED 1986) 28 pp + append.**

[This report is a contributor to WCED's OUR COMMON FUTURE, above.] In the face of wildly unstable oil pricing, this international panel recommends: making nuclear energy acceptable; increasing energy efficiency, resolving the fuelwood crisis; developing a variety of energy sources; establishing national energy agencies with overriding mandates and powers to unify and implement policies for all forms of energy. Advocates, but recognizes the difficulty in negotiating stabilization of oil prices and increasing use of renewables in the face of cheap oil. Notes poverty as major obstacle to achieving energy efficiency.

*****World Commission on Environment and Development: INDUSTRY: Report of the Advisory Panel on Industry and Sustainable Development (Geneva: WCED 1986) 19pp + append.**

[This report a contributor to WCED's OUR COMMON FUTURE, above.] The premises of this report by a distinguished international panel are in some ways more stimulating than the rather general and obvious recommendations drawn from it. Some of these are: that Third World should beware of industrial development led by consumer goods markets at the expense of longer term socio-economic goals; that developing nations might in some instances begin their industrial development at a more efficient and environmentally sound level; that basic industries will increasingly relocate to the Third World; that economies are increasingly "dematerializing;" that information about industrial processes and products must flow freely. Panel concludes that with new technology and growing awareness of the environment, the prospects for sustainable patterns of industrial development are good.

*****World Resources Institute and International Institute for Environment and Development: WORLD RESOURCES 1986: An Assessment of the Resource Base that Supports the Global Economy** (New York, N.Y.: Basic Books, 1986) 353 pp.

An impressive marshalling of facts and concise analysis in superbly designed volume. More emphasis on negative trends, but coverage of issues and summaries of problems seem quite complete.

****World Resources Institute: GUIDELINES FOR GROWTH: Multinational Corporations and Environment in Developing Countries** (Wash. D.C.: WRI, 1984) 15 pp.

Useful as a companion to Pearson's DOWN TO BUSINESS, this booklet summarizes recommendations to MNCs and host governments made by an international conference of business, government, environmentalist, and NGO representatives held by WRI as part of their two-year study of MNCs. Pearson's report is more persuasive, however, with many of the same recommendations made more understandable when accompanied by examples and a discussion of the underlying issues.

******World Resources Institute, World Bank, UN Development Program Task Force: TROPICAL FORESTS: A Call for Action** (Washington, D.C.: World Resources Institute, 10/85) Part I-49 pp.; Part II-55 pp.; Part III-22 pp.

Excellent, clear and detailed report in a three-booklet format. Overall plan calls for governments taking the lead in setting forest policy, but stresses that local participation in its application determines success. Offers good problem-solving model in fuelwood conservation, with examples and chart of strategy. Part II consists of case studies; Part III gives country-by-country recommendations for conserving forests with estimated dollar amounts for putting suggestions into effect.

UNPUBLISHED MATERIALS

******Abraham, Martin: THE LESSONS OF BHOPAL: A Community Action Resource Manual on Hazardous Technologies** (for WCED) (Penang, Malaysia: International Organization of Consumers Unions, 1985) 151 pp. typ

Remarkably cogent, comprehensive report on Bhopal and its aftermath. Both the obvious and the complex facts and issues are clearly presented in an easily absorbed outline format. Surveys the worldwide responses to the tragedy of governments, industries, international agencies, and communities. Author does not spare Union Carbide his censure, but the responsibility of host country governments to regulate TNCs and the ethical and moral obligations of all concerned when regulation fails are clearly delineated.

Two-thirds of the text are the appendixes--very useful source documents, and even a list of "quotable quotes" which adds arresting human voices to the analysis.

*****Ayensu, Edward: THE AFRICAN CRISIS: An Open Challenge (for WCED) 10pp.**

This short, clear essay makes a dual plea. To donor nations: stop food aid to Africa and instead help establish innovative national agricultural and industrial recovery plans. To African governments: summon the political will to assist their people to become self-sufficient in food production.

****-----: SCIENCE, TECHNOLOGY, ENVIRONMENT, AND SUSTAINABLE DEVELOPMENT (for WCED) 17 pp typ**

Another short essay puts forth provocative idea that developing nations have the opportunity to make the quantum jump from village-based rural societies to computer-based information societies, because both have much in common--a non-linear, decentralized, holistic universe. Author makes further point that neither donor nor recipient nations should assume that classic industrial technology is a necessity. Chief tool needed by developing nations is help with problem analysis and education in choosing among many technologies. Paper stops short of offering concrete strategies or methods for implementing these ideas.

****Banage, W.B.: POLICIES FOR THE MAINTENANCE OF BIOLOGICAL DIVERSITY (Lusaka, Zambia: Dept. of Biology, Univ. of Zambia, n.d.) typ for WCED 1986 73pp**

The very broad, long-term focus of the topic in the title seems in this report to be continually skewed toward the more urgent, compelling problem of Africa's general health. The result is a workmanlike, general report that becomes most interesting when the author includes specifics about African nations, which is not often. The topic forces him to skim over the gamut of issues--wildlife, agriculture, human settlements, politics, colonial legacy, and his recommendations for action are familiar from other reports from perhaps more distant sources, with only hints of the unique African perspective the author might have been able to provide.

***Barre, Remi: ENVIRONMENT-TECHNOLOGY DEVELOPMENT (Paris: May 1985) 18 pp typ**

Rather humdrum, abstract discussion of how technology in general is used. One notable contribution is the idea of "push and control:" both a thrust to introduce it and a process to modify and integrate it must be available in a country's government and social structure in order to successfully introduce new technology.

****Bifani, Paolo: SCIENCE AND TECHNOLOGY/ENVIRONMENT AND DEVELOPMENT** (Geneva: June 1985) 30 pp type for WCED

The 16 pages of text offers clearly stated, provocative philosophical thinking about the role of science and technology as a tool of society -- specifically of the power elite. Observes that scientists of developing nations are more loyal to the international community of their profession than to their homelands; thus there are no links between their work and their country's needs. Feels that technology from developed nations cannot be imported without bringing advanced hazards along with the advanced benefits. Calls for a heightened social conscience and increased social responsibility among scientists and a holistic attitude toward the planet (nature is not an externality to be exploited, but a planetary life system of which we are a feature) for all.

***Brewster, Havelock: REFLECTIONS ON INTERNATIONAL DEVELOPMENT STRATEGY** (UNCTAD) 29 pp typ for WCED

Excoriating critique of the United Nations and its various agencies in what the author sees as their failure to come to grips with problems of global economic development. His thesis is that international development strategy should focus on the employment as an issue that unites the Northern and Southern hemispheres. The presentation, however, is so denunciatory as to be unconstructive.

****Burton, Ian: URBANIZATION AND DEVELOPMENT** (Paris: IFIAS, Aug. 1985) 31 pp typ for WCED

On the premise that Third World urban growth is inevitable and that the task at hand is to rethink, shape, and control it, the author urges policymakers to look at the end effects of their plans and analyze (a tabular format is suggested) effects of policies outside their immediate domains. Not as cogent as it might be; recommendations are quite general.

*****Chambers, Robert: SUSTAINABLE LIVELIHOODS: A Challenge for the World Commission on Environment and Development** (Brighton, UK: Inst. of Development and Studies, Univ. of Sussex, Jan. 9, 1986) 16 pp typ for WCED

A short, hard-hitting summary of two longer treatments of the subject in which the author vehemently exhorts the WCED (and, by extension, all environmental organizations) to make livelihood for the poor its top priority and reconceive all its policies and actions accordingly. The author notes a shift from environmental thinking (ET) to developmental thinking (DT) and posits sustainable livelihood thinking (SLT) as the ultimate goal. In spite of its stridency, the essay is fresh and stimulating.

*****Chidumayo, E.N.: FUELWOOD AND SOCIAL FORESTRY (Lusaka, Zambia) 40pp.**

Cogent overview of fuelwood problems in Third World, setting them in the context of underdevelopment. Many examples from a variety of nations; fairly general recommendations.

****Crosson, Pierre: AGRICULTURAL DEVELOPMENT (Wash. D.C.: Resources for the Future, Aug. 1984) typ 67pp.**

Highly theoretical attempt to sketch outlines of world agricultural development almost necessarily results in an essay too general to be of much practical use. Cites short list of "external" factors (e.g., energy, population growth) that influence agricultural development followed by discussion of 4 broad categories of agricultural potential (e.g., low-productivity/high land potential, high productivity/low land potential, etc.). Offers the most general prediction of trends in each category.

******Egan, Joseph R.: LIFE AFTER DEATH FOR NUCLEAR POWER; A Global Survey of Nuclear Developments (New York: LeBoeuf, Lamb, Leiby & McRae, Jan. 1986) type for WCED 65pp.**

Cogent, levelheaded analysis by an engineer and public utilities lawyer of why present nuclear industry is in its death throes and what may follow. Observes that instead of nuclear industry trying to force society's institutions and infrastructure to adapt to nuclear technology, the future will see technology adapting to society's needs. Points to standardized, small (less than 450 MWe) reactors as hope of future, as these can eliminate the mammoth problems inherent in constructing huge, one-of-a-kind reactors; ease servicing; eliminate meltdown possibility (though not all potential pollution); better serve Third World Markets; reduce waste; use personnel more efficiently. Describes ongoing development of these small reactors worldwide, including Japan, Sweden, Canada, USSR, U.S.

****Finquelievich, Susana: ENERGY CONSUMPTION IN HUMAN SETTLEMENTS (U.N. University: Food-Energy Nexus Programme, Aug, 1985) 12pp typ for WCED**

Thorough summary of ways to reduce urban energy consumption. Conclusion underscores need to communicate importance of energy issues to administrators and general population.

****Fu Lixun and Zhao Dianwu: ACID RAIN IN CHINA 10 pp typ for WCED**

An information paper reporting that acid rain from SO₂ pollution (pH below 5.6) is prevalent south of the Yangtze river and seems to be due to local coal combustion. Alkaline soils in the north tend to neutralize the atmosphere. Control measures have concentrated on cleaning coal and flue gas.

******Hardoy, Jorge and Satterthwaite, David: SHELTER, INFRASTRUCTURE AND SERVICES IN THIRD WORLD CITIES** (London, Uk: International Institute for Environment and Development, 1985) 39pp. for WCED, unbound proof.

Exceptionally thoughtful analysis and deep understanding of the problem of shelter for the world's urban poor are conveyed in very readable style. Focus placed on governments' attitude toward problem and the actions or inaction that flows from it (this summarized in tabular form). Recommendations center on governmental acceptance of de facto settlements and a general relaxation of barriers in several areas simultaneously (e.g., simplifying building codes; supporting community groups; releasing suitable underused land; making available low-cost health care, building materials, financing). Cases from full range of Third World cities mentioned; general lack of progress soberly noted, even though needed government actions are relatively passive (the exception being providing utilities and roads.

***Huisingsh, Donald, et al: INDUSTRY AND SUSTAINABLE DEVELOPMENT: A Long-Term Perspective for Action, the Year 2000 and Beyond** (Raleigh, N.C.: North Carolina State Univ. 1986?) typ 39pp plus append.

Many of the case studies from the authors' excellent book, **PROVEN PROFITS FROM POLLUTION PREVENTION** are rehashed here preceded by an essay on sustainability that is itself a recitation of a somewhat dated list of global ills (e.g., "global militarization;" population growth). Rhetoric from early stages of environmentalism, though still valid, is less persuasive now. More provocative suggestions for "attitudinal and value changes" are given cursory treatment.

*****Janzen, Daniel H.: GUANACASTE NATIONAL PARK: Tropical Ecological and Cultural Restoration** (San Jose, Costa Rica: Editorial Univ. Estatal a Distancia, 1986) 103pp.

This formal proposal presents a fascinating description of an unprecedented \$11.8 million project to establish a 700 sq. km. national park of dry tropical forest land in Costa Rica. Guanacasta National Park will combine existing parks with some private lands, re-establish the native wildlife throughout the tract, and "integrate [the park] into local and national society as a major new cultural resource." Author expresses urgency to save some species from extinction and raise awareness of tropical conservation.

The explanations of why the habitats and wildlife need preservation are in effect capsule courses in tropical zoology, botany, and ecology. A summary of the private owners of the land needed broadens the scope to the human element in the drama. Janzen, a professor of biology at the Univ. of Pennsylvania and director of this enormous effort has produced a model document that fires interest not only in the project but in other relevant issues as well. Photographs.

****Kasperson, Roger: THE PUBLIC ACCEPTANCE OF NUCLEAR ENERGY: Looking to the Year 2000 and Beyond** (Worcester, MA: Center for Technology, Environment and Development, Clark University, 5/23/86) 39pp. typ

Clear, rational analysis of why public hostile to nuclear energy, with some surprising results from many polls and surveys. Bends over backward to be objective. Catalogs "pathways for acceptance" that can serve as basis for immediate lobbying and public relations efforts, as well as for reform in the nuclear industry.

***Khouri-Dagher, Nadia: WASTE RECYCLING TOWARDS GREATER URBAN SELF-RELIANCE** 18pp typ for WCED

Skimming of various ways of urban waste recycling already practiced in less developed countries. Suggests developed countries aid existing methods and perhaps adapt some of them to own use. But report too cursory to be really useful.

****Kogane, Yoshihiro: GLOBAL ECONOMIC AND TECHNICAL TRENDS AND THEIR IMPLICATIONS FOR SUSTAINABLE ENVIRONMENTAL DEVELOPMENT--MANAGING ECONOMIC GROWTH IN RESPONSE TO HUMAN NEEDS** (Tokoyo: June 1985) 51pp typ for WCED

Highly theoretical discussion of how to effect global sharing of advanced technology. Present methods seem to mandate various degrees of social change in the recipient country, whereas focus should be on modifying technology to adapt to existing social and industrial capabilities. Proposes indentification of "strategic industries" in less developed countries and complementary task forces in donor and recipients nations to ease introduction of necessary technology.

******Kosmo, Mark et al: CREATING INCENTIVES FOR SUSTAINABLE ENERGY PRODUCTION AND USE IN THE WORLD ECONOMY** (Washington, D.C.: World Resources Institute, Feb. 1986) 53pp typ for WCED

Focused mainly on the Third World, this very useful report is well supported by examples and is full of concrete recommendations that seem immediately and easily applicable. Housekeeping measures are suggested for individual industrial plants and include adjusting burners, insulating pipes, recovering waste heat, installing efficient motors, etc. Suggestions broaden to improving traffic regulation, repairing roads and tracks which ultimately saves energy nationwide;

and finally to government manipulation of prices to create energy-saving incentives. Sheer practicality of recommendations inspires action.

****Landazuri, Helena: WOMEN AND FOOD PRODUCTION IN LATIN AMERICA** (Quito, Ecuador: Fundacion Natura, 1985) 63 pp. for WCED typ

Academic presentation of data demonstrating that discrimination against women has resulted in a great underestimation of their economic role in local society and their potential for greater contribution. Studies illustrate the interweaving of a double workload in women's lives: running the household plus participating in communal productive endeavors. Author points specifically to women's untapped potential for local environmental management, e.g., water, soil, forests, that would blend easily into their accustomed domain. Also calls for a feminist enlightenment in Latin American nations, a most needed if wishfully broad recommendation.

****Mayda, Jaro: FOREST MANAGEMENT AND THE ENVIRONMENT: Worldwide Trends in Legislation and Institutional Arrangements** (Univ. of Puerto Rico, 1984) 15 pp.

This short energetic paper revealing an original and lively mind, has very little to do with its title or with forestry. The subject is the laws and institutional arrangements for applying them in developed societies--more specifically, the human folly that prevents these mechanisms from functioning smoothly and rationally. Author offers simplified schemata for decision-making designed to unify the premises, data bases, aims and processes of the tangle of agencies usually involved with environmental policies. Impossibly utopian, perhaps, but nonetheless refreshing.

****.....: EXTERNAL DEVELOPMENT AID; NEW POLICY CONSIDERATIONS** (San Juan, P.R., Univ. of Puerto Rico) 9pp typ for WCED

Another short, energetic paper having little to do with its title. Author feels aid to third world has been misguided for a number of reasons that stem from failure to truly realize that "development is about people." Feels the environmental impact assessment, a potentially useful tool, has been wasted due to failure to realize that "For any purpose other than studies in natural ecology, environment is human environment." Most of paper devoted to the nature of decision-making thinking and the relationship between policy and law--an echo of the above paper.

***Mendoza, Guillermo Gallo and Victor Bravo: RURAL ENERGY POLICY IN LATIN AMERICA** (_____): Instituto de Economica, Nov. 1985) 43pp + 33pp append. typ for WCED

A thorough analysis, unfortunately masked by dense sociological prose, of rural poverty in Latin America and the Caribbean, where in nine countries, more than 50% of the population is undernourished.

Recommendations are unassailable, but too abstract to be of immediate value. Appendixes contain numerous economic and agricultural production tables.

****Mintzer, Irving: Untitled "STATEMENT" [on greenhouse effect]** (Wash. D.C.: World Resources Institute, June 24, 1985) typ for WCED 21pp.

Emergency call for immediate measure to buy time until we know more about greenhouse effect: reducing fossil fuel use; repair gas leaks; medicate cows to reduce methane production; clean up emissions; recycle fluorocarbons. Urges WCED to stimulate international action, warning that requiring further research to precede action only paralyzes.

***Okita, Saburo: THE FUTURE OF MULTILATERALISM** (_____): International Univ. of Japan) 6pp typ for WCED

Brief statement opining simply that although multilateral endeavors and approaches to global problems have declined recently, technology, trade, finance, information flow will mandate multilateralism over the long term.

****Pardoe, G.K.C.: NEW TECHNOLOGIES IN RELATION TO ENVIRONMENTAL MANAGEMENT** (Brentford, U.K.: General Technology Systems, Ltd., Nov. 1985) 13pp typ for WCED

Describes space technology that has aided environmental monitoring. e.g., earth observation, weather watching, hurricane warning, communications satellites for education. Notes that the microelectronic industry may not be as good a job-and income-generator for third world countries as is often supposed, since high standards necessary for export mean that the work is better done by machines than people. Touches on touchy issue of who has rights to information from global observation: author has clear-cut opinions, but these questions are probably not easily answered.

*****Pearson, Charles: MULTINATIONAL CORPORATIONS, ENVIRONMENT, AND DEVELOPMENT** (Wash. D.C.: Johns Hopkins Univ. Sch. of Advanced Studies, March 1986) typ for WCED 50pp

A condensation, updated by approximately one year, of author's publication for World Resources Institute, DOWN TO BUSINESS. Conclusions seem essentially unchanged: multinational corporations not principally responsible for serious environmental problems in developing nations; MNCs do, however, have a highly visible effect on the environment, both positive and negative; MNCs beginning to take more active role in managing potential and actual disputes; all concerned are beginning to reconcile economic development and environmental protection in their thinking under the concept of sustainable development.

***Raskin, Paul: ENERGY PLANNING FOR DEVELOPMENT** (Boston, MA: Energy Systems Research Group, 4/4/86) 26pp. typ for WCED

Offers a general conceptual framework in abstract language. For example, states obvious need for Third World nations to train staff, adopt methods of data evaluation and planning procedures with help of international organizations; but makes no concrete suggestions for doing this better than it has been done. Advocates use of computers but gives no hint how to introduce them.

***Sachs, Ignacy: HUMAN SETTLEMENTS: Resource and Environmental Management** (Paris, Ecole des Hautes Etudes, Aug. 8, 1985) 8pp. typ for WCED

Rational overview of how to remedy plight of cities and make them "self-reliant." Blames social inequality, private consumerism, and inadequate social consciousness for creation of urban poverty. Calls for reconsideration of dichotomy between agricultural rural areas and industrial urban areas; for regarding city as an ecosystem and "retooling" accordingly. Rationale stops short at usual stumbling block, however--political obstacles. Given that theories and technology exist for retooling cities, how to get people to apply them? This literally gets no more than a post script.

****Shrivastava, Paul: ORGANIZATIONAL MYTHS IN INDUSTRIAL CRISES** (New York, N.Y.: Graduate School of Business, N.Y. Univ.) 50pp.

Actually an analysis of the Bhopal tragedy and what can only be taken as cover-up attempts on the part of Union Carbide and the local Indian government, despite the author's token (and perhaps intentionally ironic) efforts to present this as an anthropologically styled study of "myths". Though in part unintentional, the author claims, six untruths were perpetrated which gave the public an erroneous impression of the disaster, i.e., that medical treatment was swift and efficacious; that the death toll was low; that Union Carbide had no control over the plant; that restrictive Indian law made insuring plant safety difficult; that Union Carbide was financially able to withstand whatever lawsuits and penalties might ensue; that "it can't happen here" in the U.S. A good round-up of the facts; also includes a useful chronology of the event.

****Silk, Dana: URBAN AGRICULTURE** (Paris, Centre International de Recherche sur l'Environnement et le Developement, Sept. 1985) 15pp typ for WCED

Cities some surprising statistics on urban and home gardens: 1/3 to 1/2 families in third world cities garden; 1/2 households in U.S. garden; 85% of vegetables in China grown in urban gardens. Describes advantages that seem modest but are important in the aggregate: the effects of home and urban gardening on attitudes toward environmental protection, on urban ecology, on diet, on family economics. Advocates official encouragement of gardening. A low priority item, but not to be overlooked. A welcome, positive recommendation.

****Stein, Robert E. and Grenville-Wood, Geoffrey: THE SETTLEMENT OF ENVIRONMENTAL DISPUTES: A Forward Look** (Wash. D.C. Environmental Media-tion International, Dec. 1985) 29pp typ for WCED

Little more than an extended outline of dispute settling techniques possible, mostly on national and international levels, with cursory examples to illustrate them. Serves to arouse interest in subject and desire for more detailed and more specific treatment.

***Szabolcs, I: AGRARIAN CHANGE** (Budapest: Inst. for Soil Science and Agricul-tural Chemistry) 52 pp typ for WCED

Workmanlike essay presenting opinion that there is more than enough vir-gin, fertile soil on earth to feed all but that it is continually being reduced by con- version to other uses and by various industrial practices (e.g., mining). Author notes no shortage of information for rectifying situation; only dearth of "integrated capacity of decision-makers." Calls for leadership of scientists with managerial abilities.

***Takacs: HAZARDOUS WASTE MANAGEMENT POLICY IN HUNGARY** (Waste Management Section, Hungarian Ministry of Environmental Protection and Nature Conservation) 4 pp typ for WCED

Information paper describing some features of the state of hazardous waste handling in Hungary. Author describes environmental legislation of 1984 which stipulates that the polluter is responsible for damages and clean-up, and that all in- dustries must account for all raw materials used; any discrepancy between input and outgo in form of products or properly handled waste is punishable. No permits for transporting or exporting hazardous waste are required. No permit for import- ing such material has been issued in the last three years.

******Walter, Ingo: ENVIRONMENTAL RESOURCE COSTS AND THE PAT- TERNS OF NORTH SOUTH TRADE** (New York: Dept. of Economics and Finance, Grad. Sch. of Business Admin., NY Univ., April 1986) typ 38 pp

Applies a simple, inventive statistical analysis to the question of whether the South is being exploited industrially by the North and how. Public generally believes that Northern industries escape costly environmental regulation in their home countries by building plants in other, laxer nations. Author cites studies that show regulation does not affect investment patterns. He then applies his innovative technique of computing the cost of environmental care-taking per product (based on U.S. data) and comparing the value of all imports with those from less developed countries. While they do not bear more than their share of costs for manufactured goods, further analysis reveals that 60% of raw materials-based im- ports come from less developed countries (e.g., oil, gas, food products, textiles,

chemicals, iron, steel). Author clearly states limitations to his assumptions; even so, this is an vital aid to making finer and important distinctions.

*****White, Rodney: EXTRA DOMAIN POLICY IN LINKS IN URBAN AND ENVIRONMENTAL MANAGEMENT IN SENEGAL** (Toronto: Dept. of Geography and Institute for Environmental Studies, Nov. 8, 1985) 34 pp typ for WCED

Senegal is ideal for case studies of various environmental and sociological phenomena, as it is small, self-contained, stable, and of a fairly uniform climate and topography. Author offers a compact, clear report on the interacting effects of the applied economic, social, energy, and trade policies on the nation as a whole. Includes concrete recommendations for forestalling or alleviating looming problems.

*****Wignaraja, Ponna: INDUSTRY AND SUSTAINABLE DEVELOPMENT: A Long-Term Perspective for Action** (For WCED) 39pp. typ

Highly intelligent, forthright analysis of failure of industrialization/modernization/urbanization development policies to benefit large populations in the Third World. Notes that full range of political approaches from anger and rebellion to nonviolent pacifism to outright financial aid have often failed to stimulate and enable a nation's poor to protest their lot and work constructively for change. Advocates a program of Participatory Action Research (PAR) that requires an educated, sympathetic leader to lead an indigenous group into self-exploration and critical awareness of their sociopolitical environment, and further into creating their own plan of action. Falls short of full discussion of feasibility and concrete effects of PAR.

*****Wynne, Brian: CHARACTERISING UNCERTAINTY IN ENERGY POLICY ANALYSIS** (Univ. of Lancaster, U.K., May 30, 1985) 21pp. typ for WCED

Abstract topic handled deftly and clearly. Proposes that policy makers make careful distinctions among ignorance, uncertainty, and risk and between technological and institutional uncertainty when considering a course of action. This will lead to a broader and more complicated "front-end" analysis of a situation, bringing those who will be ultimately affected by a policy closer to the creation of it, and will anticipate problems and alternatives while commitment and thus the cost of change is still low. He also urges the application of parallel policies that may have a mutually supportive effect. More examples might have been helpful.

PERIODICAL ARTICLES

****Hardoy, Jorge and Satterthwaite, David: THIRD WORLD CITIES AND THE ENVIRONMENT OF POVERTY** (London, U.K.: Geoforum, Vol 15, No. 3, pp.304-333, 1984)

Predictable hazards of poor urban settlements--no waste disposal, clean water, pollution control--are reported with capsule descriptions of major problem cities. Authors believe nearly every nation has means to alleviate the worst of its problems, but note that there is little sign that they are doing so. Photographs.

*****-----: URBAN CHANGE IN THE THIRD WORLD: Are Recent Trends a Useful Pointer to the Urban Future?** (To be published in Habitat International, Vol 10, No. 3, Sept./Oct., 1986) 24pp. typ

Answer to the title is "No". In explaining why available data on Third World cities is not reliable and that therefore generalizations and projections about them (e.g., predictions about explosive growth) are not valid, authors proceed to give reader a valuable breakdown of all the factors and variables to consider when evaluating urbanization in nearly any Third World nation. Some of these factors: the size of settlements deemed to be "urban"; the age of migrants to and from such centers; what proportion of labor force is agricultural; government policies forcing or prohibiting movement; the overall health of the nation's economy.

ANNOTATED BIBLIOGRAPHY

Karen Morrell

Coverage of environmental issues in the mass media tends to be crisis-oriented and short-lived, particularly in newspapers and weekly mass circulation magazines. The lay person interested in environmental issues will probably already be familiar with mass circulation magazines such as Geo, Science, Scientific American, and other publications like the National Geographic. This list is intended to guide those interested in specific issues to be addressed at the Only One Earth Forum to other sources where a more in-depth treatment of these issues may be found.

The list is categorized according to types of publications - journals and organization-specific publications - and some indication is given of each publication's content, intended audience and readability. Each publication is assessed from the standpoint of its coverage of one or more of the following topics:

I

Food, energy, land and human resource development, with particular reference to Africa -- including regional energy planning and development, agricultural and ecological rehabilitation, and land and human resource development.

II

Managing hazardous substances -- including large scale transboundary problems, small scale exposure to hazardous substances, and risk perception and communicating risks.

III

Sustainable agricultural ecology -- including policy issues, integrated application of traditional and emerging technologies and development of national/regional strategies.

IV

Human settlements: factors affecting the quality of life -- including urbanization, impediments to providing shelter, planning, and coexistence of urban/rural areas.

V

Managing risk and complexity -- including principles and strategies for action and institutional arrangements.

JOURNALS

Usually scientific papers, research data or case studies aimed at researchers and practitioners of the particular field (or related fields) covered. The academic field of the editor (where indicated) often signals the major focus of the journal.

Economic Development and Cultural Change Editor: D. Gale Johnson. Publishers: The University of Chicago Press, Journals Division, P.O. Box 37005, Chicago, Illinois 60637 - ind. subscription \$30.00 per year, quarterly.

Journal which traces the effects of economic growth and development on cultural change. Scientific presentation of research data, including useful articles on agricultural practices, economics of agriculture, effects of agricultural technology, and urbanization. Takes an international perspective. Includes book reviews. Useful for topics I, III, and IV.

Economic Geography Editor: Gerald J. Karaska. Publishers: Clark University, Worcester, MA 0160 - ind. subscription \$20.00, quarterly.

Intended for academics and professionals interested in the "intelligent usage of the world's resources." Scientific presentations of research data. Good coverage of rural development, regional planning, analysis of settlement patterns, and urban restructuring. Includes book reviews. Useful for topics I (though not specifically Africa), IV, and to some extent V.

Environment and Behavior Editor: Robert B. Bechtel, University of Arizona, USA. Publishers: Sage Publications, 275 S. Beverly Drive, Beverly Hills, CA 90212 - ind. subscription \$28.00 per year, bimonthly.

This interdisciplinary journal concentrates on the interrelationships between human environments and behavioral systems and is mostly of interest to behavioral scientists. Material on reactions to various environmental situations, such as living conditions, and on planning policy related to controlling environment or behavior. Predominantly urban focus looking at existing or potential situations. Articles in recent years have been U.S. oriented - though studies could be applied to other cultures. Useful for those concerned with topics IV and V.

Environment and Planning Editor: A.G. Wilson, School of Geography, University of Leeds, England. Publishers: Pion Limited, 207 Brondesbury Park, London NW2 5JN, England - ind. subscription \$315 per year, monthly.

Heavily scientific journal, largely of interest to academics and regional systems planners. An abundance of material on regional systems planning, industrial location, migration, spatial competition and interaction. Recent issues concerned with mostly macro-level research. Includes book reviews. Useful for those interested in topics I (though not specifically Africa), IV and V.

Geographical Analysis Editor: W.A.V. Clark. Publishers: Ohio State University Press, 1050 Carmack Road, Columbus, Ohio 43210 - ind. subscription \$20.00 per year, quarterly.

Highly scientific and technical journal for geographic theoreticians. Includes information on land use transition, deforestation, spatial theories, agricultural location. International in scope. Includes sections of research notes and comments. Useful for topic IV.

Habitat International Editors: O.H. Koenigsberger, S. Groak, and B. Bernstein. Publishers: Pergamon Press, Headington Hill Hall, Oxford OX3 OBW, U.K. - ind. subscription \$220 per year, quarterly.

A journal concerned with all aspects of human settlements - recent issues have more heavily concentrated on urban settlements. A wealth of information on urban development, international communications and transport, urban environment and energy systems, and policy issues related to urban growth and planning. The issues of impediments to providing shelter and/or poverty eradication are also covered. Takes an international perspective. Useful for topics I (though not specifically Africa), IV and V.

The Journal of Modern African Studies Editor: David Kimble. Publishers: Cambridge University Press, 32 East 57th Street, New York, NY 10022 - ind. subscription \$95 per year, quarterly.

Largely discussion papers of current issues in Africa - political, economic, environmental - aimed at promoting a better understanding of the situation in Africa. Good information on food production, agricultural technology, peasant agriculture, and agricultural markets. Useful for topic I.

Human Ecology Editors: Susan H. Lees, Daniel G. Bates, Dept. of Anthropology, Hunter College (CUNY), New York, NY USA. Publishers: Plenum Press, 227 West 17th Street, New York, NY 10011 - ind. subscription \$35.00 per year, quarterly.

An interdisciplinary journal concerned with the interaction between man and his environment. Mostly micro-level research of community responses to environmental issues. Very good for historical and international perspectives of human responses to environment. Useful for topics I (though not particularly Africa), III and V. Topic IV is also well covered by articles in this journal, but with more emphasis on rural areas and rural/urban coexistence than on urbanization.

International Journal of Environmental Studies Editor: J. Rose, College of Technology, Blackburn, England. Publishers: Gordon & Breach Science Publishers, New York, NY - ind. subscription approx. \$234 per year, bimonthly.

This journal also is concerned with the relationship between man and his environment, but with an emphasis on the environmental impact of technology. The topic range is very broad, and research data is at both micro and macro levels. Contributions also range from highly scientific data and research studies to very readable presentations of policy or ethical issues. At times, the articles are concerned with Third World regions, particularly Asia and the deforestation issue. Particularly useful for those interested in managing hazardous substances and managing risk and complexity. Useful for all topics, except topic IV which does not figure prominently.

Journal of Regional Science Editor: Ronald E. Miller, Department of Regional Science, University of Pennsylvania. Publishers: Regional Science Research Institute (in co-operation with Department of Regional Sciences of the Faculty of Arts and Sciences, University of Pennsylvania), P.O. Box 3735, Peace Dale, RI 02883 - ind. subscription \$55 per year, quarterly.

Mostly concentrated on economics and regional planning, spatial theories, population structures, but some useful information on urban issues, housing, and public housing. Highly scientific articles. Includes book reviews and selected titles from current journals. Useful for topic IV to people willing to wade through statistical models.

Marine Pollution Bulletin Editor: R. B. Clark, Dept. of Zoology, Newcastle University, Newcastle upon Tyne. Publishers: Pergamon Press, Headington Hill Hall, Oxford OX30BW, U.K. - ind. subscription DM305 per year, monthly.

A journal aimed at marine environmentalists, scientists, engineers, administrators, politicians and lawyers. Concerned with the protection of waterways and includes news, comments, research reports, etc. on noxious substances, and management and productivity. International scope. General round-up of current issues, plus scientific presentations of research data. Includes information on conferences and books. Useful for topic II.

Natural Resources Journal Editor: Albert E. Utton. Publishers: University of New Mexico School of Law, 1117 Stanford N.E., Albuquerque, New Mexico 87131 - ind. subscription \$20 per year, quarterly.

Journal aimed at scholars and policy makers relating environmental issues and public policy. Recent issues have included information on managing fisheries, constraints to food production, water resources management. Includes sections for student writings, book reviews. Public policy orientation and analytical, but very readable. Useful for all topics, particularly V.

Regional Studies Editor: J. Taylor, Dept. of Economics, University of Lancaster, U.K. Publishers: Cambridge University Press, 32 East 57 Street, New York, NY 10022 - ind. subscription \$140 per year, bimonthly.

Presents research and discussion paper related to urban and regional development. Mostly of interest to economists, geographers, policy makers. Aims to be international in scope. Includes policy review section and book reviews. Useful for topic IV.

World Development Editor: Anne G. Drabek. Publishers: Pergamon Press, Maxwell House, Fairview Park, Elmsford, NY 10523 - ind. subscription DM214 per year, monthly.

This journal is aimed at stimulating and improving "development of appropriate science and technology in developing countries" and at demonstrating "constructive co-operation with low income countries." Discussion papers and articles on, for instance, the relationship of population pressure and agricultural development, effects of IMF programs, industrial growth, and peasant agriculture. Potentially useful for topics I, III, IV and V.

ORGANIZATION-SPECIFIC PUBLICATIONS

Two types of publications are included: Journalistic or reporting formats, aimed at lay people interested in environmental issues; and scientific magazines aimed at scholars or professionals in a particular field, often published by membership organizations or associations.

American Land Forum Editor; Sara Ebenreck. Publishers: American Land Resource Association Inc., 5410 Grosvenor Lane, Bethesda, Md 20814 - ind. subscription \$20 per year, quarterly.

Elegant and literary magazine providing information on issues relating to land in the United States - agriculture, impact of migration, development, the environmental agenda. Includes stunning photographic portfolios and book reviews. Focussed on the U.S. but of potential interest for topics I, IV and V.

Conservation Exchange Editor: Laurie Baker Walden. Publishers: National Wildlife Federation, 1412 16th Street, N.W., Washington, D.C. 20036-2266 - free of charge, quarterly.

This newsletter attempts to inform corporate leaders and involve them in the process of seeking ways to balance the need for economic growth and natural resource protection. It concentrates on environmental protection and economic development and publicizes corporate responses to public crises and technological advances that reduce conflict with environmental conservation. Useful for topics II and V.

Development Forum Editor: Jacques Bauchere. Publishers: United Nations Division of Economic and Social Information, DPI and the United Nations University - free of charge, ten times a year in English, French and Spanish.

Aimed at creating informed public opinion on issues related to development, including environmental issues, nuclear safety, urbanization, conservation and technology. Newspaper format and international in scope. Useful for all topics.

Environment Editors: Gilbert F. White, William C. Clark, Alan McGowan. Publishers: Heldref Publications, division of non-profit Helen Dwight Reid Educational Foundation, (in co-operation with Scientist's Institute for Publication Information) - ind. subscription \$23.00 per year, 10 issues.

An exceptional magazine aimed at bringing scientific data and research to the public's attention in a very readable manner. Each issue deals with two or three topics - well written for the lay person, with photographic illustrations. Each issue also contains comment or reports on current legislation or issues, extracts from magazines or press releases, reviews of reports or conferences on environmental issues. Mostly U.S.-oriented. Very strong coverage of managing hazardous substances and managing risk and complexity. Useful for all topics except topic IV which does not figure prominently.

Environmental Science and Technology Editor: Russell F. Christman. Publishers: American Chemical Society, 1155 16th Street, N.W., Washington, D.C. 20036 - ind. subscription \$45 per year, monthly.

Highly scientific and technical magazine including sections on regulatory issues, but does deal with risk assessment and risk management. Useful for the scientist interested in topics II and V.

EPA Journal Publishers: U. S. Environmental Protection Agency, Office of Public Affairs, Washington D.C. 20460 - ind. subscription \$20 per year, ten times a year.

A magazine intended to inform public opinion and report on the "balance between human activities and the ability of natural systems to support and nurture life." Broad range of issues mostly related to the United States, but some transboundary issues are covered, such as acid rain and hazardous wastes in waterways. Includes sections on current issues and awards and appointment. Useful for topics II and V.

Human Ecology Forum Editor: James Titus. Publishers: New York State College of Human Ecology, Cornell University, Ithaca, New York - ind. subscription \$12.00 per year, quarterly.

This magazine is mostly concerned with the activities and research conducted by the college - including making environments more human, affordable housing, hazardous substances, nutrition. It is presented in journalistic style and deals largely with human problems affected by environment. Useful for topic IV.

The IDRC Reports Editor: Rowan Shirkie. Publishers: Communications Division, IDRC, P. O. Box 8500, Ottawa, Canada K1G3H9 - subscriptions free of charge, quarterly in English, French and Spanish.

Reports on activities funded by the International Development Research Centre (Canadian public corporation) and others in international development. Particularly concerned with agriculture, and health, information, social and communication sciences. Written in journalistic style, with one or two page illustrated articles. Emphasis on introduction and use of "appropriate technology" and small scale innovations that serve as models or demonstrations for technology transfer and biotechnology. Often highlights individuals who are making some particular contribution or impact. Useful for topics I, III and IV.

Impact of Science on Society Editor: David Spurgeon, UNESCO. Publishers: UNESCO, 7 Place de Fontenoy, 75700 Paris, France - ind. subscription \$35 per year, quarterly.

A journal of descriptive and discussion papers with an international perspective. Each issue covers a specific topic in depth. Sample topics include "Scientific Research and Tomorrow's Farming," "High Technology and Multinationals," etc. Useful for all topics.

IRPTC Bulletin Publishers: United Nations Environment Programme (UNEP), 1211 Geneva 10, Switzerland.

The International Register of Potentially Toxic Chemicals contains information on national and international activities of this group, news about specific chemicals and legislation on chemical substances. A useful tool for those interested in topics II and V.

Habitat News Publishers: United Nations Center for Human Settlements, P.O.Box 30030, Nairobi, Kenya - free of charge, three times a year.

The official newsletter of this organization covers all aspects of human settlements with an international scope. Particularly useful for a round-up of current events, it reports in journalistic style on U.N. meetings, activities of non-governmental organizations, and technical cooperation in research and development. It includes news on individual countries, publications, a calendar of events, and bibliographic notes. Potentially useful for all topics.

Sierra Editor: J. Keough. Publishers: Sierra Club, 730 Polk Street, San Francisco, CA 94109 - ind. subscription \$12, bimonthly.

A magazine which contains brief reviews of priority environmental issues, for instance, forestry, energy, hazardous waste, wildlife, and in-depth coverage of three or four issues. It also includes information about Sierra Club activities. Concerned with environmental protection and personal exploration of the environment in which we live. Largely U.S. focussed. Useful for topic II.

UNEP News Publishers: Information Service, UNEP, P. O. Box 30552, Nairobi, Kenya - subscription free, bimonthly.

A news bulletin covering items of environmental interest around the world. Brief articles, journalistic style, intended to inform lay public. Includes useful supplements which record environmental events such as natural disasters, major incidents, achievements, quoting world media sources. Also includes calendar of environmental meetings. Useful for all topics.

Worldwatch Papers Publishers: Worldwatch Institute, 1776 Massachusetts Avenue, N.W., Washington, D.C. 20036, USA; President, Lester Brown - ind. subscription \$25 per year.

Periodic papers concentrating on one issue written by staff of Worldwatch Institute. Topics include forestry, energy conservation, inflation, soil erosion, population, nuclear power, recycling resources, pollution, etc. Style varies with author but in general a distillation of the major data and issues surrounding the particular topic. Useful for all topics.

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