



PAPERS SUBMITTED BY  
HEADS OF INTERNATIONAL ORGANIZATIONS AND NGO'S

"The Premises for Building a Sustainable Society"

ADDRESS BY DR. MOSTAFA K. TOLBA

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OF

UNITED NATIONS ENVIRONMENT PROGRAMME

TO

THE SPECIAL COMMISSION ON ENVIRONMENT AND DEVELOPMENT

Geneva, 1 October 1984

In the period since the Stockholm Conference in 1972 our ideas about the relationship between environment and development have undergone a fundamental change. Far from being in conflict with economic growth, the environment is now seen as its friend. No-one now challenges the concept that we should use the world's natural resources sustainably. Information, ideas, theories, sufficient to fill a large library, have emerged - yet the fact remains that those ideas have been too seldom applied.

The result is that in 1984 the four main biological foundations of the global economy - croplands, grasslands, forests and fisheries - are under greater strain than ever before. We have the know-how and most of the means to build a sustainable global society, and yet we appear, in many areas, to be going backwards.

It is all very perplexing and frustrating. It is as though we confront the Minoan maze but lack the golden thread to guide us to the centre.

This has been a prevalent feeling at UNEP's Governing Council and in its Secretariat. How far have we advanced in achieving a common understanding of environmental issues? Where are we heading? And what are our ultimate goals?

In an endeavour to provide the answers the decision was taken by the Council to prepare an Environmental Perspective to the Year 2000 and Beyond. For this purpose it established its own Intergovernmental Preparatory Committee. The Perspective document would be presented to the General Assembly for adoption. A Special Commission comprised of eminent international figures would assist the Council in addition to its work in addressing the larger issue of environment in the global problematique. The General Assembly endorsed the Council's recommendations, generous funding from various governments was pledged and your Chairman and Vice-Chairman were appointed by the Secretary General of the United Nations.

I am pleased to note that the Chairman and Vice-Chairman, have succeeded in appointing a distinguished body of fellow members with full regard to geographical distribution. And to assist the Commission members a permanent secretariat has now been established under the leadership of Mr. Jim MacNeill whose outstanding work with OECD is well known. In UNEP we are confident that Mr. MacNeill and his colleagues in the Secretariat with their expertise in environmental concerns will serve the Commission members well.

In UNEP we are also all committed to establishing a fruitful and harmonious relationship with the Commission. As you know the General Assembly stipulated that close ties should exist between the Commission and the Intergovernmental Inter-Sessional Preparatory Committee, set up by the Governing Council, to prepare the Perspective Document.

In fact the foundations of such a close relationship were laid, Madame Chairman, when you addressed the Preparatory Committee's first session on your plans for the Commission. Its task is at once exciting, and challenging. I welcome this opportunity to extend UNEP's full

co-operation in the evolution of what you termed "a long term strategy for survival of this planet; a strategy which recognizes the interdependent nature of human activity and endeavour."

We are looking to this strategy to provide the global community with new inspiration and direction; in short to be our "golden thread".

Madame Chairman, Mr. Vice Chairman, Members of the Commission.

Though the idea for a Commission evolved within UNEP, and though it will fall to our Governing Council to transmit your report to the General Assembly, it is not part of our function to say how the Commission should tackle its job. But I thought it might be helpful if today I devoted the major part of my statement to outlining what we see as the premises for building a sustainable society.

We are convinced that progress in tackling environmental despoilation depends on a more thorough understanding of its linkages, direct and indirect, with the wider aspects of economic and social development. The environment affects, and is, in turn, affected by the forces which have created and still govern the global problematique.

But when - from an environmental standpoint - we attempt to identify those forces, the threshold into the maze is crossed. They include:

- \* the mismanagement of our natural resource base,
- \* poverty and its impact on human beings and their environment,
- \* Over-consumption and the impact of the demands of the privileged on the environment,
- \* population growth, especially in those areas where the increase in human numbers is undermining the carrying capacity of the biosphere,
- \* the squandering of human and natural resources on the development and manufacture of armaments,
- \* the widespread lack of understanding on the part of decision-makers and the public at large of the implications of environmental destruction for social, economic and political stability.

What, then, are the premises for possible solutions? From what base will we move the ideas for sustainable development into action?

The first and most important premise is the generally agreed perception that economic development and environmental quality are interdependent and, in the long term, mutually reinforcing. The rational management of the world's threatened natural resource base forestals a loss in environmental quality and enhances sustainable economic growth. For example, recycling of waste materials serves environmental and economic objectives simultaneously.

A second premise is the need to view environmental problems as a system. A coherent set of solutions are required to ensure they each have a positive impact on the other. For example a hydro-electric dam

may be built to generate electricity and provide water for irrigated agriculture, but both objectives - more energy and more food - will be frustrated in the long term unless steps to conserve watersheds, and to avoid eutrophication and salinization are taken during the planning and construction stages.

A third is flexibility and anticipation. If we start from the premise that today's problems will also be tomorrow's, then we needlessly close future options. We need to keep a weather eye on problems as they evolve. We need to devise a long term and flexible response that will help in overcoming the inevitable time lag between agreeing on solutions and applying them.

Fundamental to this objective is a system for monitoring and anticipating environmental trends. Satellite monitoring and other techniques have vastly improved our capacity for observing environmental changes. Within limited manpower and human resources, UNEP's Global Environmental Monitoring System has made important progress, providing decision-makers with the hard data they need for forward planning. If we are to successfully anticipate future changes, a great deal more attention will need to go into environmental monitoring.

A fourth premise is that actions should be sufficiently dynamic to have a meaningful and positive impact on the system. The implication is that processes in the problematique which are by their very nature capable of having such an impact and of being directed, must be identified and harnessed.

The large scale and dynamic process in the problematique which may be harnessed to resolving environmental problems, and which mal-addressed causes them, is development. The idea thus is that development should be harnessed to solve the problem of the global problematique, and should do so in a stable manner over the long term. The capsule phrase given to this idea in UNEP is sustainable development.

Fifth must be a much greater awareness among the public and decision-makers in particular of the environmental dimension to the global problematique. Without public pressure for action little that is positive will be achieved. Unless people - in developed and developing countries - understand more fully what is at stake, and how their future well-being is threatened, our objectives will not be realised. Implementing sustainable development strategies will demand trade-offs and, sometimes, short-term sacrifice. It is only through greater public understanding that a political climate will be created that will allow decision-makers to take the required actions.

I think it is fair to say that increasing numbers of the public are aware that the pressures on the environment are mounting. The loss of tropical forests, species extinctions, the encroaching deserts, acid rain, nuclear waste disposal, dangerous pesticides, chemical dumping, soil erosion, the human settlements crisis - these are environmental issues that have aroused a good deal of public concern.

But I think it is also fair to say that beyond the constituency so well represented here today, there is little or no understanding that these environmental problems are merely symptoms of more deep-seated,

more intractable forces. And that these are generated by insufficient or poorly executed development.

There is even less understanding that we are all in this together. The consequences of environmental destruction pay no heed to social, political and economic barriers. A more thorough understanding of environmental interdependence between nations is an essential pre-condition for building a sustainable society.

Until recently we in the environment movement have been very good at pointing out what is going wrong with the world. Our case for sustainable development has rested squarely on the negative. But there are signs that we are moving into a more pragmatic, more clear-eyed phase. During the debate on desertification at our most recent Governing Council it was notable how government after government called upon UNEP to point to instances where schemes to combat the advancing desert had been successful. They wanted some encouragement; they wanted, in other words, to see sustainable development in action.

Thus, the major tasks facing the Commission are clear: to conceptualize sustainable development in operational terms and to develop long term strategies for its achievement. And they must be strategies which appeal and have meaning to people who may have little or no knowledge for the environment. And here I am talking of the planners, economists, businessmen, politicians, lawyers, accountants, soldiers, engineers whose decisions decide the course of development, and thereby the fate of our human environment. With such a course embarked upon, the golden thread will surely begin to unwind.

To mean anything these strategies must bring hope to millions who live on or near the margins of existence. The 2 billion who must chop firewood to meet their meagre energy needs; the rural and urban majorities in developing nations who lack access to safe water and sanitation; the 850 million who live in the shadow of creeping deserts; and the as yet uncounted millions of drought victims who have eaten their seed grain and slaughtered their breeding livestock. They have been forced to discount tomorrow in the struggle to survive today. Their lifestyle is one of self-immolation - if we fail to answer their needs, if we fail to point out ways and means they can become beneficiaries of development, then this exercise will have been a futile waste of time.

I believe you would agree that unless the underprivileged are made to feel that they have a full role to play in development, no strategy for sustainable development can hope to be successful. This means that the Commission will need to confront some thorny issues; and the strategies suggested will not always be palatable.

Foremost will be the issue of improving land tenure. When a farmer feels insecure the tendency is to 'mine' the land until it is no longer productive, then moving on elsewhere to repeat the process. As a recent World Bank Report stated: "There is vast potential in improving inequitable land tenure patterns which promote poverty, environmental degradation and inefficient natural resource use". Surely this is an absolutely crucial factor? For unless the underprivileged are given security of tenure, little headway will be made in improving environmental management in the rural areas. Much the same applies to dealing with the developing crisis in the world's urban areas.

The daunting prospect facing the global community is a population stabilizing at around 10 billion people midway through the next century. We must expect that in the short term the numbers of the absolute poor will increase, making more difficult the aim of achieving a balance between environment and development.

This need not be a cause for despair. The increase in population is essentially a result of our success in conquering many diseases and in providing a greater quantity and variety of food. With the notable exception of Africa, per capita increases in food output have kept pace with the increase in human numbers. The challenge is twofold: to identify the causes of environmental destruction and the elements of success. We need to weed out the former and build on the latter.

A problem the Commission is certain to encounter is that in general, neo-classical economics and environmental management are difficult to merge, mainly because environmental values are difficult to quantify. Environmental consequences such as air quality, soil fertility and so on have important implications for human health or agricultural productivity and although these may be important economic factors they are not amenable to exact measurement. How, for example, do you put a price tag on keeping a river unpolluted? On preserving an endangered species that may turn out to be of major economic value? And what is the economic justification for conserving slow-reproducing renewable natural resources such as whales, redwoods or tropical hardwoods? The classic economic approach would be to destroy them completely and invest the profits in a more lucrative enterprise.

However, when we see how marine pollution and destruction of fish breeding grounds is undermining marine-based economies; when we see how deforestation is affecting local climate patterns; and when we see soil erosion undermining agricultural productivity, we see also the bankruptcy - quite literally - of the traditional approach which measures successful development purely in high GNP growth rates. Such an approach creates powerful incentives for countries to "liquidate" their natural resource base as rapidly as possible.

What needs to be achieved is an accommodation in economic decision-making of the long term social, aesthetic, spiritual and, of course, economic consequences of the irreversible liquidation of natural capital. It all comes down to keeping the options open for ourselves and for future generations. In short, the need is to define the specific principles of sustainable development and couple them with current economic theories and practices.

Madame Chairman and Commission members, I do not underestimate the difficult burden you have so selflessly assumed. A burden made all the greater by the complexity and the fog of uncertainty still surrounding the relationship between people and the systems of the world. Though we have learnt a great deal, it has served merely to show how much we have still to learn about the relationships and linkages between people, resources, environment and development. Take the term "carrying capacity", so much in fashion these days. It is not a fixed concept, but metamorphoses as human numbers increase, as climate shifts, as ecosystems evolve, as development patterns change.



Not in the next few generations will the global systems be so fully understood that they may be treated mechanically, and in prescribing solutions, a sense of humility is required. Our approaches should be tempered by awe of our natural and social inheritances. A spirit of not destroying what we are yet to comprehend, a spirit of symbiotic partnership with all that matters on our planet should guide our actions. This too is an aspect of "sustainable development". Strategies for sustainable development must look to people, motivate them and give them the tools to achieve their aspirations. To deal with the issues of environment thus becomes a matter which transcends environmentalists, who must look to the conviction they carry with humanity as a whole as they pursue their economic or social or military or reproductive activities. Conceptualization must start from two basic perceptions:

- life processes are inter-connected in intricate ways:
- air, water, land and life constitute an inter-locking system;
- Elements vital to all life move in cycles between the rocks, water, air and living matter. Harsh experience has shown that beyond certain limits these cycles cannot be disturbed without causing irrevocable damage. A recognition of these limits is at the heart of environmental management. We must use nature but we must maintain natural systems sufficiently intact to sustain genetic richness and to maintain the supportive cycles of the biosphere.

It is not only that the life processes are inter-connected but that the seamless web spun by today's trade, communications and finances has submerged the inter-connections in the world's economic and political systems as well. These inter-connections are increasingly placed in jeopardy by the conflicting demand for resources and the growing divergence of need, interest and power among countries at different stages of development. It is necessary in the interest of all to seek adjustment of these differences so that sustainable development of the poorer regions of the world receives first priority. Otherwise population is less likely to be stabilized and political tensions and pressures on resources will inevitably increase.

In formulating appropriate strategies for sustainable development, it will be necessary:

- (1) to evaluate the realistic options available to countries and groups with different socio-political systems and at different stages of economic efficiency and technological advancement.
  - (2) to disseminate information on environmental and conservation problems so that decision-makers at all levels, and in different sectors, move from react-and-cure to anticipatory and preventive policies.
  - (3) to make explicit the linkages that exist between development and low-waste and non-waste technologies, recycling, industrial and energy planning and so forth.
- and (4) to achieve a number of critical transitions:

- energy transition to an era in which energy is produced and used at high-efficiency without aggravating other global problems;
- demographic transition to a stable world population of around 10 billion;
- resource transition to reliance on nature's "income" and not depletion of its "capital".

Ladies and Gentlemen.

The Commission was seen as an essential means to achieve the task because governments in the Governing Council of UNEP and in the General Assembly felt that the eminence of the participants, working in substantive independence, and mobilizing great resources of experience in all the areas of the global problematique, would not only develop the needed approaches but carry conviction with the world community. This would greatly assist governments in their own tasks intergovernmentally, in reaching the required agreements and in implementing them.

However, the Commission may well ask - how far has UNEP itself progressed in this task? Since the Stockholm Conference and the creation of UNEP, many initiatives have been taken, and I would like to describe the principal ones as stages or bench-marks in a process, and share with you some conclusions.

1. At the Stockholm Conference itself the concept of poverty as a major pollutant was made explicit for the first time. And it was widely accepted that the pressures on life-support systems generated by poverty are as significant as the pollution created by industry, technology and over-consumption by the affluent: both lead to the rapid depletion of basic natural resources. The conclusion reached in terms of sustainable development was the need to internalize environment constraints in development.

2. At the joint UNCTAD/UNEP Symposium on Patterns of Resource Use, Environment and Development Strategies held at Cocoyoc in Mexico in October 1974, the internal and international linkages of patterns of consumption in developed and developing countries were considered and the concept of "ecodevelopment" was developed. According to the Cocoyoc Declaration the road ahead lies - and I quote - "through a careful and dispassionate assessment of the outer limits, through co-operative search for ways to achieve the inner limits of fundamental human rights, through the building of social structures to express those rights, and through all the patient work of devising techniques and styles of development which enhance and preserve our planetary inheritance".

3. I pointed out to the World Food Conference in the same year that any strategy to increase food production on a sustained basis should explicitly take account of the complementarity of environment and development. The objective must be to maximise food production without destroying the ecological basis for sustainable production. I noted that strategies to solve the world food problem must be developed in full knowledge of the web of inter-dependence that exists between food production and the other major problems facing mankind.

4. A series of seminars were organized by UNEP in co-operation with the Regional Economic Commissions during 1979 and 1980. The regional seminars clearly showed that to reach meaningful conclusions on alternative development patterns and lifestyles, attention must focus on a broad range of interrelated issues including: technological options and resource profiles, patterns of rural development, including particularly food systems and management of renewable resources, patterns of urban development and, above all, questions relating to institutional aspects of management and participatory planning. These conclusions were considered, in turn, by the executive secretaries of the regional economic commissions and experts who met in Nairobi in March 1980. They made recommendations to the Preparatory Committee for the New International Development Strategy. These Recommendations considered that "humankind is a part of the biophysical world, acts upon it and is affected by its reactions. The biophysical world is the life-support system of society and provides space, a flow of materials and energy, and a medium for the reabsorption of wastes. These functions of the environment, adequately understood and wisely managed, constitute a basis for the achievement of the goals of development. It is essential, therefore, that the interaction between patterns of development and the environment be fully and explicitly taken into account in the New International Development Strategy for the 1980s".

These and other recommendations from UNEP were taken into account in the framing of the New International Development Strategy for the Third UN Development Decade, adopted by the General Assembly in December 1980. The present IDS stresses the need for a development process which is environmentally sustainable over the long run and protects the ecological balance.

5. In 1980 the World Conservation Strategy produced by IUCN in partnership with UNEP and WWF was published. It set out clearly the objectives for living resource conservation:

- a) to maintain essential ecological processes and life support systems.
- b) to preserve genetic diversity

and c) to ensure the sustainable utilization of species and ecosystems.

6. A decade ago, following upon the first World Population Conference in Bucharest, the General Assembly called for a programme of studies on the interrelationships between population, resources, environment and development. But it quickly became clear that the conceptual base was lacking, and UNEP turned its attention to building such a base. A symposium on interrelationships was held at Stockholm in August 1979. The Symposium was followed by two UNEP-convened sessions of a high-level expert group on the interrelationships, in 1980 and 1981. The group developed the required conceptual approach and among its major recommendations, subsequently endorsed by the Governing Council, ECOSOC and by the General Assembly itself, were:

- the exercise should be on the interrelationships between people, resources, environment and development. While the demographic variable was an important dimension, the issue of making people effective participants in and beneficiaries of the development process was central;

- a systemic approach should be tried in a limited number of geographically or otherwise distinct areas identified by the experts;
- a system-wide programme of work should be established, together with a voluntary fund to support it.

At present, the UN system is working on two case studies, one on the deforestation of the Himalayan Foothills, and one on carrying capacity in Kenya.

In a major contribution to the 2nd U.N. Population Conference, UNEP outlined its position on the role of population increase as a causative factor in resource over-exploitation. You may wish to look at this statement and also at the section of the 1985 State of the Environment Report which will consider the population and environment issue in detail.

7. A relevant initiative taken by UNEP is our Programme on Peace and Security and the Environment. We sponsored the Galtung Report which you may wish to examine. I addressed the Special Session of the General Assembly on Disarmament and drew attention to the fact that the traditional military concept of security was becoming increasingly obsolete. It must be broadened to include such threats as the depletion of natural resources and a deterioration of the living environment. A commitment to the concern of environmental betterment must be seen as a long-term commitment to national and global security. The long-term cumulative effects of even a limited nuclear exchange on the environment, the so-called "Nuclear Winter", has recently demonstrated the magnitude of such disruptions and their irreversible nature.

8. UNEP has undertaken the development of analytical tools to make clear and more effective the integration of environmental considerations in development projects, programmes and planning. Our current programme of work includes the preparation of cost-effective and simplified formats for environmental impact assessment, the application of cost-benefit analysis to environmental protection measures, the adaptation of integrated physical, socio-economic and environmental planning to the requirements of the developing countries and other tools. One area to which particular attention is being paid is the linking of environmental and resource data to traditional economic data (the production of goods and services) through the integration of environmental statistics in the System of National Accounts. In this way, "satellite" accounts could be constructed which will show environmental and natural resource losses and gains as a supplement to financial indicators. There will be a joint World Bank/UNEP meeting in November this year to develop guidelines on environmental accounting for use by developing countries.

9. At the Session of a Special Character of the UNEP Governing Council in 1982, the Nairobi Declaration was adopted. In that Declaration both the poverty of the South and the wasteful consumption patterns of the North were described as threats to the environment since both could lead people to over-exploit their natural resource base and the regenerative capacities of nature. Emphasis was laid on the inter-connection and inter-relationships between environmental problems and concerns. The SSC urged Governments, inter alia, to establish or strengthen their national mechanisms for the integration of environmental considerations into development planning.

10. The 1984 State of the Environment Report considered the role of the environment in the dialogue between and among developed and developing nations. It shows how environmental concerns are central to the political, economic and social issues on which the dialogue concentrates. And it puts the case for environmental interdependence by arguing that economic problems and widespread poverty force people to misuse resource and degrade their environments. This, in turn, makes economic growth and reforms harder to achieve. You may wish to consider this document during your deliberations.

Madame Chairman.

I believe Commission members would agree that UNEP's initiatives in this field could provide you with some building blocks. I am certain you will wish to draw on this experience, to which most of you were party, as you set about the work of conceptualizing sustainable development. You have two short years to complete your work, and I would like to pledge UNEP's fullest possible assistance with your endeavours. We have the utmost confidence that your report will provide the international community with a new vision and a new sense of purpose as we work to build a sustainable global society.

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2 October 1984

MRS. GRO HARLEM BRUNDTLAND  
CHAIRMAN  
WORLD COMMISSION ON ENVIRONMENT  
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UNATIONS  
GENEVA  
(SWITZERLAND)

FOR MRS. GRO HARLEM BRUNDTLAND CHAIRMAN WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT. BY END CENTURY WORLD POPULATION WILL SURPASS 6 BILLION AGAINST 3 BILLION TWENTY YEARS AGO AND ABOVE 4.3 BILLION TODAY. FAO STUDY ON AGRICULTURE TOWARD 2000 ESTIMATES NEEDS TO DOUBLE AGRICULTURE PRODUCTION AT CURRENT LEVEL CONSUMPTION THROUGH EXTENSION NEW CROP LAND BY 28%, INTENSIFICATION AGRICULTURE INCLUDING EXPANSION IRRIGATION OVER 57 MILLION HA. IF WE ACKNOWLEDGE NEED TO RAISE AGRICULTURAL PRODUCTION TO MEET FOOD NEEDS WORLD POPULATION FOLLOWING QUESTIONS ARISE; IN MAKING EFFORT TOWARDS GREATER YIELDS IN AGRICULTURE FORESTRY AND FISHERIES DO WE NOT RUN RISK EXHAUSTING OUR CAPITAL NATURAL RESOURCES BY SACRIFICING LONG TERM FOR SHORT TERM BY FAILING MANAGE WORLD PATRIMONY IN THE INTEREST FUTURE GENERATIONS? WHAT APPROPRIATE METHODS CAN BE EMPLOYED IN TROPICS TO INCREASE PRODUCTION AND RAISE LIVING CONDITIONS OF URBAN AND RURAL POPULATION WITHOUT DEGRADING ENVIRONMENT? THERE ARE AT PRESENT DISQUIETING INDICATIONS OF SERIOUS DEGRADATION AND THREAT TO NATURAL RESOURCES BASE ESSENTIAL FOR AGRICULTURE IN BOTH DEVELOPING AND DEVELOPED COUNTRIES. IN DEVELOPED COUNTRIES UNPRECEDENTED RISE IN STANDARDS OF LIVING WITHIN LAST THREE DECADES HAS BROUGHT HEAVY DEMANDS ON NATURAL RESOURCES OF BOTH INDUSTRIAL AND DEVELOPING COUNTRIES. IT HAS STIMULATED DEVELOPMENT HIGHLY INDUSTRIALIZED ENERGY INTENSIVE AGRICULTURAL TECHNIQUES IN ORDER MAXIMISE PRODUCTION, THIS HAS CREATED PROBLEMS OF INCIPIENT LAND

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DEGRADATION, WASTE DISPOSAL WHICH NECESSITATED TECHNICAL LEGAL MEASURES TO REDUCE ENVIRONMENTAL IMPACT. FURTHER AGRICULTURAL INDUSTRIES LIKE OTHER INDUSTRIAL ACTIVITIES HAVE CAUSED POLLUTION OF LAND, WATER AND AIR AND CONTAMINATION FOOD AND FEED WITH IMPACT ON NATURAL RESOURCES SUCH AS FORESTS. IN DEVELOPING COUNTRIES MAJOR ENVIRONMENTAL CONCERNS ARE DEGRADATION OF NATURAL RESOURCES FOLLOWED BY INCREASING POLLUTION PROBLEMS AND THEIR IMPACT ON FOOD SUPPLY, MALNUTRITION AND DISEASES ON MAN. UNPRECEDENTED RAPID INCREASE IN POPULATION HAS PLACED GREAT PRESSURE ON NATURAL RESOURCES. CONSEQUENT DRIVE TO INTENSIFY PRODUCTION HAS DISLOCATED TRADITIONAL AGRICULTURAL SYSTEMS AND SOMETIMES CAUSED TOO RAPID ATTEMPTS TO REPLACE THEM BY MODERN AGRICULTURAL TECHNIQUES THAT IN MANY CASES PROVE UNSUSTAINABLE UNDER PREVAILING ECOLOGICAL, CULTURAL AND SOCIO-ECONOMIC CONDITIONS. MANY OF THESE DEVELOPMENTS ARE TAKING PLACE IN TROPICAL ECOSYSTEMS INCLUDING FORESTS THAT ARE MORE FRAGILE THAN THOSE IN TEMPERATE ZONES, WHILE FULL SCIENTIFIC KNOWLEDGE ON PRODUCTIVE CAPACITY OF THESE ECOSYSTEMS STILL LACKING. WITHIN THIS CONTEXT RECENT STUDIES ON POTENTIAL POPULATION SUPPORTING CAPACITIES OF LANDS IN DEVELOPING WORLD INDICATES THAT BY THE END OF THIS CENTURY, THE ENTIRE LANDS OF DEVELOPING COUNTRIES - ALMOST THREE TIMES THE PRESENT CULTIVATED AREA - WOULD BARELY BE SUFFICIENT TO FEED THEIR EXPECTED POPULATIONS IF LOW INPUT METHODS OF FARMING CONTINUED TO BE USED. NO LESS THAN 64 COUNTRIES - 29 OF THEM IN AFRICA - WOULD BE UNABLE TO FEED THEIR PROJECTED POPULATION FROM THEIR OWN LAND RESOURCES WITH LOW LEVELS OF INPUTS. SOME 2450 MILLION HECTARES, ALMOST TWO FIFTHS OF THE LAND AREA, WITH 60% OF THE TOTAL POPULATION, WOULD BE CARRYING MORE PEOPLE THAN AREA COULD SUPPORT, REPRESENTING A SERIOUS THREAT TO HUMAN WELFARE AND THE ENVIRONMENT. THIS CAN LEAD TO DRASTIC REDUCTIONS IN FARM SIZE

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TO UNECONOMICAL LEVELS WITH IMPLICATIONS FOR LAND USE AND FARMING SYSTEMS; THESE ARE THE MOST CHALLENGING CONCLUSIONS OF THE FIRST ATTEMPT TO ANSWER SCIENTIFICALLY THE QUESTION; HOW MANY PEOPLE ARE THE LANDS OF THE DEVELOPING COUNTRIES CAPABLE OF FEEDING? THIS STUDY BY FAO REVEALS, HOWEVER, THAT MANY OF THE 64 CRITICAL COUNTRIES WOULD BE ABLE TO FEED THEIR EXPECTED POPULATIONS FROM THEIR OWN LANDS IF THEY COULD RAISE THE LEVEL OF FARMING INPUTS OR SLOW DOWN THEIR RATES OF POPULATION GROWTH. IT ALSO DEMONSTRATES A HUGE POTENTIAL FOR FOOD SELF-SUFFICIENCY IN FOUR OUT OF FIVE DEVELOPING REGIONS - AND IN THE DEVELOPING WORLD AS A WHOLE.

FURTHER THIS STUDY POINTS TO THE NEED TO RESEARCH AND PROMOTE APPROPRIATE FARMING SYSTEMS TECHNOLOGIES TO MEET THE INCREASING FOOD DEMAND AND RAISE LIVING CONDITIONS OF POPULATION IN DEVELOPING COUNTRIES.

OTHER IMPORTANT ENVIRONMENTAL ISSUES WHICH WILL BECOME MORE CRITICAL TOWARD 2000 IF IMMENSE AND DILIGENT ACTION IS NOT TAKEN NOW ARE: DEFORESTATION; DEGRADATION OF GRASSLAND RESOURCES; DEPLETION OF GENETIC RESOURCES; DESERTIFICATION SOIL DEGRADATION INCLUDING SALINIZATION, WATER RESOURCE SHORTAGE; POLLUTION OF SOIL AIR AND WATER TO AFFECT AGRICULTURE FORESTRY AND FISHERIES PRODUCTION INCLUDING THE FOOD CHAIN. IN THIS LATTER CASE IMPORTANT TO NOTE THAT FISHERIES PROVIDES NEARLY ONE QUARTER OF WORLD SUPPLY IN ANIMAL PROTEIN.

FAO READY TO FURTHER DISCUSS AND PROVIDE DETAILED INFORMATION ABOVE ISSUES TO COMMISSION. WISHING YOU EVERY SUCCESS IN YOUR DELIBERATIONS. BEST REGARDS. (EDOUARD SAOUMA, DIRECTOR-GENERAL, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS)



21 SEP. 1984



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13 September 1984

Dear Mrs. Brundtland,

As requested in your cable dated 9 July 1984, I have pleasure in sending you herewith a statement on Unesco's approach to environmental issues, for circulation to the first regular session of the World Commission on Environment and Development.

I trust you have by now received my cable of 12 September 1984 concerning Unesco's representation at the above session.

Yours sincerely

John B. Kaboré  
Acting Assistant Director-General  
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## UNESCO'S APPROACH TO ENVIRONMENTAL ISSUES

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### Evolution of Unesco's concern

Placed by its Constitution at the crossroads of education, science and culture, Unesco since its creation has been deeply involved in the relationships between man and nature. As early as 1948, under the leadership of its first Director General, the eminent British biologist, Julian Huxley, Unesco sponsored jointly with the French Government at Fontainebleau a Conference for the establishment of what was to become the International Union for Conservation of Nature and Natural Resources.

Twenty years later, in September 1968, Unesco, with the cooperation of the United Nations, the Food and Agricultural Organization (FAO) and the World Health Organization (WHO) organized in Paris an Intergovernmental Conference of Experts on the Scientific Basis for the Rational Use and Conservation of the Resources of the Biosphere. It was this Conference - the first held at the intergovernmental level on the subject as a whole - which gave rise in 1971 to the Programme on Man and the Biosphere (MAB), an interdisciplinary research, experimentation and training programme which today constitutes a central feature of the Organization's activities concerning the environment.

Between these two dates, 1948 and 1968, Unesco prepared and carried out several scientific programmes, all hinging on the same theme of natural resources and the environment in relation to human activities. These included the Major Project on Scientific Research on Arid Lands launched in the Mid-1950's, the expeditions, studies and permanent services of the Intergovernmental Oceanographic Commission established in 1960, or the International Hydrological Decade, which began in 1965 and is followed up today by the International Hydrological Programme. At the same time many of these scientific activities became more and more interdisciplinary in character, with a significant input from the social sciences, and were supplemented by a major

involvement in the protection of monuments and of the cultural heritage.

These few milestones in Unesco's action show that, at the time of the 1972 UN Conference on the Human Environment, the Organization had not only built up a highly diversified network of contacts and machinery for scientific cooperation in the field of environment and natural resources but had also already achieved substantial results.

The Stockholm Conference fully confirmed the value of the lines of action adopted by Unesco and encouraged it to continue to actively develop its work. In this respect it can be noted that the debates in Stockholm did not appreciably change the spirit in which Unesco was already working. For example, it will be recalled the Biosphere Conference had stressed the idea that the conservation and protection of the environment ought to be an integral part of the rational use of its resources, an idea that the Stockholm Conference solidly endorsed in its assessment of the links between environment and development.

While the spirit of Unesco's programme remained fully in keeping with the ideas that had brought them about, the Stockholm Conference and the subsequent establishment of UNEP with its Environment Fund were to increase substantially their scope and their impact.

For instance Unesco had for a long time endeavoured in connection with its educational activities to create awareness of the need for preserving nature and natural resources and giving to the study of the environment its rightful place. The Organization has always sought also to have education programmes relate to the reality of socio-cultural situations and take the major concerns of the relevant societies into account. However, it was not until after the Stockholm Conference, and thanks to the backing of the Environment Fund, that a truly international programme of general education relating to the

environment could be implemented by Unesco. That programme was based on the work of an intergovernmental conference organized in Tbilisi in 1977. Then, little by little, the Organization's own programme of continuing activities in this important field developed, justifying what has been called the catalytic role of UNEP in the United Nations system.

Today, environmental problems have reached a very high place and priority in Unesco's programmes. The Medium Term Plan for the period 1984-1989 has been based on an analysis of world problems and of the contribution that Unesco can bring to their solution. It is very significant to note that one of the "Major Programmes" of the Plan resulting from this analysis is entitled "The human environment and terrestrial and marine resources". This Major Programme receives over US\$ 31 million for the biennium 1984-1985, which corresponds to approximately 14% of the organization programme funds. The corresponding figures were approximately US\$ 5 million for 1973-1974 and US\$ 18.5 million for 1977-1978, showing a significant growth rate (after correction for inflation) for this part of the Organization's budget. To these regular programme funds should be added extra-budgetary resources, including UNDP, UNEP and Funds in Trust, which approximately double the above figures.

The importance of Unesco's involvement in the environmental and natural resources field is mentioned here as an indication of the unanimous support of Member States for this Major Programme and for their appreciation of the ideas which sustain its orientation and implementation. A very recent consultation of Member States for the preparation of the 1986-1987 Programme and Budget shows that this unanimity and this appreciation still prevails so that high priority will continue to be given to the Major Programme and that no important change in content and approaches is expected in this field in the near future.

A balanced set of activities

Without entering into details, it seems appropriate to indicate the range and scope of activities carried out under the Major Programme "The human environment and terrestrial and marine resources" since these activities correspond to Unesco's assessment of major environmental issues and to its contribution to their solution. Needless to say that these activities are conducted in close cooperation with other UN organizations concerned, particularly UNEP, FAO, WHO, WMO, UNDRO and HABITAT as well as with the international scientific community.

Under the Major Programme, a first programme is devoted to "The Earth's crust and its mineral and energy resources". This is essentially a programme in the earth sciences, which includes an important cooperative research effort called the International Geological Correlation Programme but covers as well activities dealing with the use of geology in land-use planning and the interactions between the lithosphere and human activities such as mining and groundwater use.

A second programme is devoted to "Natural hazards". It is concerned with the scientific assessment of natural hazards, including earthquakes, volcanic eruptions, landslides, etc.. and of their prediction. It also deals with the mitigation of risks arising from all natural hazards, including the development of preventive measures such as zoning of human activity or earthquake engineering.

A third programme deals with "Water Resources". This essentially covers the research, training and cooperative activities of the International Hydrological Programme (IHP), to which some 130 countries participate under the guidance of an intergovernmental council. The programme aims first at improving our understanding of hydrological processes,

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including both the quantity and quality of both surface water and ground water. On the basis of this understanding, the programme develops scientific and technical knowledge and trains the necessary personnel for the assessment, planning and rational management of water resources. From its strictly hydrological beginnings the IHP has evolved towards a problem-oriented scientific approach - therefore an interdisciplinary one - to the multi faceted question of environmentally sound water resources development.

A fourth programme covers "The ocean and its resources". This is a broad programme which includes the activities of the Intergovernmental Oceanographic Commission (IOC) to which 110 countries participate. The UN Convention on the Law of the Sea has vested the international community and individual countries with added responsibilities in the exploration, conservation and management of the resources of the oceans and the programme therefore gives special emphasis to the strengthening of national and regional capacities in this field. Several internationally coordinated activities of IOC have special relevance for the protection of the environment. Thus a specific programme, related to the World Climate Programme, is devoted to the study of the role of the ocean in climatic change. Another programme deals with the study and monitoring of pollution in the marine environment and the evaluation of the state of health of the oceans. It should also be noted that ocean research activities of IOC are supported by permanent services, including the Integrated Global Ocean Services System, The Tsunami Warning System in the Pacific or the International Oceanographic Data Exchange.

A fifth programme deals with the "management of coastal and island regions". These regions being located at the interface between the land and the sea are particularly complex and fragile, have high economic potential and biological productivity, and are subject to formidable human pressures through demographic increase, human migration, urbanization, industry, tourism, etc.. The programme develops syntheses of knowledge on the interactions between terrestrial and marine environments

in coastal and island systems. Through an interdisciplinary approach it aims at establishing a scientific basis for the integrated management of coastal zones and of islands, using the methodology of the MAB Programme and the contributions of the programmes in marine sciences and in water sciences.

The sixth programme deals with land-use planning and terrestrial resources. It constitutes the most important component of the MAB Programme, an intergovernmental and interdisciplinary research and training programme to which more than 120 countries participate under the guidance of an international council. The MAB programme aims at providing through an interdisciplinary and problem-oriented approach which includes both the natural and social sciences, the scientific knowledge needed to manage environmental resources in a rational and sustained manner. It places special emphasis on integrated pilot projects for research, monitoring, demonstration and training, with participation of decision-makers and local populations. In relation to land-use planning and terrestrial resources, the Programme concentrates on humid and sub-humid tropical regions and an arid and semi-arid lands, with two corresponding networks of integrated pilot projects. It also includes a number of projects concerning the temperate and cold zones, including coniferous forests, tundra, mountains and mediterranean biomes, where particular attention is paid to the impact on ecosystems of pollution, eutrophication, pesticides and fertilizers. A special effort is made for dissemination of applicable results in appropriate form to decision-makers and planners.

The seventh programme deals with "urban systems and urbanization". It constitutes the counterpart for urban areas of the previous programme and centers also around the MAB approach. Urban areas are considered and studied as systems, with measurement of flows of matter, water, energy and people, with a view to throwing light on their functioning and rational management. Some fifty urban areas, large or small, have already been studied in this manner around the world. The programme is accompanied by training activities and promotion of

public awareness and perception of urbanization problems.

The eighth programme deals with the "natural heritage". It centers around two very specific activities. The first one, which pertains to the MAB Programme, consists in the establishment of an international network of biosphere reserves. Biosphere reserves are representative ecological areas where conservation of plant and animal species in a core area is accompanied by ecological research, monitoring, training and education and where traditional human activity may be maintained in a buffer zone, thus contributing to ensure the support of the population concerned. At this date 226 biosphere reserves have been designated in 62 countries and an international plan of action for biosphere reserves is being drawn for approval by the MAB Coordinating Council and for endorsement by the governing bodies of UNEP, FAO, Unesco and IUCN. The second activity consists in the implementation of the Convention concerning the Protection of the World Cultural and Natural Heritage adopted in 1972 and to which 82 countries are parties. Under this Convention, a number of natural sites of outstanding universal value are already inscribed on the "World Heritage List" and can therefore benefit for their protection of the cooperative mechanisms which are provided by the Convention, including the World Heritage Fund.

The ninth and last programme under the Major Programme deals with "environmental education and information". It provides for production and dissemination of scientific information on all aspects of the environment, including through such means as poster-exhibits or the quarterly journal "Nature and Resources": It includes a major effort for the development of general environmental education in schools and out-of-schools, in cooperation with UNEP. It also promotes environmental awareness at the educational level among professional groups such as engineers and economists.



### Major issues for action

The above indications on Unesco's environmental concerns and main lines of activity, although limited to the domain of competence of the Organization, should provide an overall idea of major issues upon which action should concentrate in future years.

This need for action remains particularly pressing since, despite the measures taken in recent years, most environmental problems are still a source of concern, and taken as a whole they are still growing. Available data on the scale of soil-erosion, loss of soil fertility, desertification and deforestation (especially in the tropical regions), scarcity of fuelwood, air and water pollution, the disappearance of animal and plant species, the speed and increasingly acute problems of urbanization, the precariousness of food production for rapidly growing human populations, and a number of other problems reveal the seriousness of the current situation in the world and particularly in developing countries. In this context the national and international efforts to protect and enhance the human environment should be vigorously pursued and strengthened notwithstanding the economic difficulties encountered by most countries. It is abundantly clear from Unesco's experience and viewpoint that this protection and enhancement of the environment should be seen in the context and as part of sound economic, social and cultural development.

For this reason the problems of the environment should not be artificially separated from those of rational utilization of natural resources. While such a separation may be required at certain levels of action, it should never hide the need for an integrated approach and the search for harmonious relationships between people, resources, environment and development. In this respect it is particularly necessary to integrate conservation of nature and of genetic resources with land resources development, an approach which may encounter considerable difficulties at the local level and which will require major efforts in future years. The concept of biosphere reserves

constitutes a significant contribution to this problem and should therefore be firmly promoted and implemented.

Generally speaking the integration of the environmental dimension in the development process is hampered by a number of obstacles which have still to be surmounted in economic thinking, in administrative structures, in decision-making, in applied research, in education, in public information, etc.... Public perception and attitudes as well as national institutions in all fields are not yet adapted to the handling of non-linear systems such as those with which societies are faced when integrating environmental - and also social and cultural - considerations in economic development. In order to improve this situation, major efforts appear to be required for innovative approaches in such fields as scientific research, general education and public information.

Concerning scientific research on rational environmental management it has been often said that sufficient knowledge is available and that the problem is to apply this knowledge. Such an overwhelming statement hides the fact that existing knowledge is often not applied because it is not applicable. Much of it is of a theoretical character, or related to experience acquired in different ecological or socio-cultural conditions, or simply of a "linear" character neglecting interactions between the various elements of the problem studied. In some cases, such as tropical soil biology or marine biology, fundamental knowledge itself is inadequate. There is therefore a pressing need for well designed research on environmentally-sound management of natural resources, a need which has been recently recognized in various quarters, including the World Bank.

The research effort which is required in the years to come should essentially be problem-oriented and to a large extent interdisciplinary, involving the basic and applied natural sciences as well as the social and human sciences. The research programmes should be formulated in close consultation with the planners and decision-makers including engineers and economists, and should take full account of the socio-cultural conditions and

of the skills and aspirations of the populations concerned. This approach, which is advocated by the MAB Programme, encounters the traditional obstacles of disciplinary compartmentalization, particularly between natural and social sciences, as well as those of separation between research and decision-making. Only a major problem-oriented research effort can however provide the sound basis upon which the environment/development issues can be resolved.

The research effort which is needed concerns all aspects of environment and natural resources, depending on local conditions and local priorities. The growing pressure of human populations and the complexity of the problems involved indicate that a considerable research effort will be needed for the rational management of urban areas and of coastal regions in developed and developing countries alike. At the same time, the precarity and gravity of the food situation will require further basic and problem-oriented research in such fields as the understanding, maintenance and where possible enhancement of soil fertility (particularly in the humid tropics), the increased efficiency of irrigation, the development of aquaculture or the applications of microbiology. These examples naturally do not exclude the need for continued research in other types of ecosystems, such as the tropical forests, or other domains such as renewable energy sources.

Concerning education in schools and out of schools, the efforts which have been initiated to integrate the environmental dimension are still in their first stages and can only yield fully their fruits in the long run. These efforts will have to be actively pursued in developed and developing countries alike, while carefully adapted to local conditions. Their aim will be to facilitate the proper understanding of his environment by every child and help him shape responsible attitudes towards this environment and natural resources.

Concerning public information a major effort remains to be undertaken to mobilize the media on an in-depth and well balanced presentation of environmental and natural resources issues. The successful and high quality achievements of the last few years remain grossly insufficient to provide the public with a full and correct appreciation of the problems and to help it, particularly in developed countries, to modify certain perceptions and attitudes which have far reaching consequences for the whole world.

Environmental problems by their large scale implications offer wide opportunities for international cooperation, including on global issues such as carbon dioxide or the health of the oceans.

Increased efforts should be made to further develop this cooperation. This can take place in North-South relations, particularly for research and training activities around subjects and areas of great scientific interest and economic potential. Such increased North-South cooperation on the environment can provide a solid basis for a wider dialogue on the related questions of resources and the international division of labour. The extreme diversity of environmental and ecological conditions in the various regions, sub-regions and countries of the world prohibits however generalized recipes and calls for properly rooted approaches to local problems. This demands vigorous efforts to develop in all countries the capacity to assess, study and manage the environment and the natural resources. It also offers highly promising opportunities for cooperation between countries having similar problems, including South-South exchanges of personnel and information at the level of "eco-regions". This cooperation at the sub-regional or inter-regional level, which is slowly shaping up, for instance in the case of humid tropical forests or of semi arid grazing lands, should be strongly encouraged. The research and training programmes of Unesco briefly presented above, including the MAB Programme with its interdisciplinary, flexible and highly-decentralized approach, represent an avenue for action which

should be developed and could be expanded to the areas of management, technical cooperation and international development.



28 . . . 1984

28 SEP. 1984

Téléphone Central/Exchange: 91 21 11

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In reply please refer to:

EHE/E5/86/1

Prière de rappeler la référence:

Mrs Gro Harlem Brundtland  
Chairman  
World Commission on Environment  
and Development  
Route des Morillons, 15  
1218 - Genève

27 September 1984

Madam,

I have the honour to refer to your invitation to present and discuss WHO's views on the issues that the Commission should address. May I take this opportunity to congratulate you on your nomination as the Chairperson of the World Commission on Environment and Development.

As the Secretariat of the Commission has already been informed, unfortunately, I will not be in Geneva at that time. I hope that there may be another opportunity to meet with the Commission but, in the meantime, I wish to assure you of the interest the Organization takes in the work of the Commission and in the plan to bring forth to the world community the Environment Perspective to the Year 2000 and Beyond.

I do not need to emphasize the crucial interrelationship between the environment and human health. Unfortunately, the health of the people and their productivity are not sufficiently taken into account for environmental decision-making and I hope that the work of the Commission will help to address this important problem.

The goal of Health for All by the Year 2000 set for the world community by WHO's Member States pursues the aim that by the end of this century all people may enjoy a state of health which will enable them to lead socially and economically productive lives. For this to be possible, determined action inter alia must be decided upon and taken to improve the unsanitary and unhealthy environment in which a vast majority of the people live today, especially in developing countries. This aspect of environmental decision-making leaves much to be desired. Yet, the cycle of poverty, unsanitary environment, ill-health and the consequent inability of the people to contribute fully to their own development must be interrupted. The Commission has an important task in dealing with this priority issue in respect to the health-environment relationship.

Looking into the future, the Organization is most concerned about the increasing environmental health hazards associated with the production, use and disposal of chemicals as well as with hazards arising from physical

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Mrs Gro Harlem Brundtland, Chairman,  
World Commission on Environment and Development,  
Genève  
EHE/E5/86/1

27 September 1986

factors in the environment. The toxic and radio-active wastes and their management are only one part of this problem. Other concerns are the need for assessment and monitoring, regulatory control and more generally prevention. As the Commission looks at the year 2000 and beyond, it will no doubt address itself to another aspect in the health-environment relationship, i.e. the threats to man's physical, social and mental health posed by the rapidly growing urban areas, particularly in the developing countries. The hazards to human health constitute one of the main environmental issues which peoples of the world will face in the future.

Finally, I should like to stress that for the most part health considerations in environmental management or in the development of their institutions have not received the attention they deserve by the Governments. I would hope that the work of the Commission will help deepen the awareness of all concerned to these all important issues.

I believe it would be useful for the Secretariat of the Commission to be in touch with the technical staff of WHO. For this purpose, I have pleasure in designating Dr B.H. Dieterich, Director, Division of Environmental Health, to be the point of contact. Dr Dieterich will be available to provide such information which the Commission may need regarding WHO's programmes and activities.

I wish the Commission success in its important task.

I have the honour to be,  
Madam,  
Your obedient Servant,



H. Mahler, M.D.  
Director-General

STATEMENT BY THE SECRETARY-GENERAL OF THE WMO

Distinguished colleagues: I am informed that the World Commission on Environment and Development intends, at this stage, to obtain an overall view of problems that might be considered in the course of its work over the next one and a half years or so. For this purpose, you will inevitably be confronted with a formidable array of issues for review from which a critical few will need to be chosen. In order to assist you in this task, I will attempt to spotlight a number of issues related to the environment and development which seem to be important from the vantage point of the World Meteorological Organization.

Weather and climate play a significant role in all spheres of human activity. The present state of the climate system rests on reciprocal influences interacting between its various interlinked components (atmosphere, oceans, cryosphere and land surface/biosphere). The distribution of temperature and precipitation and climate/land-surface biosphere interactions largely determines the type of plant and animal life forms that can be supported in different regions of the world. The climate of a given locality and the world could be substantially altered if human activity consciously or inadvertently begins to interfere with the atmosphere and other climate system components. The possibility that the man-induced emission of radiatively active gases (e.g. CO<sub>2</sub>) could alter the planetary radiation balance and climate is of considerable concern to all. Further, the atmosphere as a medium is a rapid carrier of pollutants - aerosols, particulate matter and gases can circumnavigate the globe from a few weeks to a few months; transboundary pollution transport and acid rain are major environmental problems.

With this background, I would like to propose the following issues for the consideration of the World Commission on Environment and Development.

1. Climate change and potential impacts

History documents the adverse and, on occasion, catastrophic consequences of change in climate and climatic variability. A significant effort is warranted in order to better grasp this issue regionally and globally.

- CO<sub>2</sub> induced climate change: It is generally accepted that increasing concentration of atmospheric CO<sub>2</sub> will lead to global warming. While there is some uncertainty about the precise magnitude of warming, there is considerably less knowledge about the regional distribution of temperature change, and possible changes in precipitation patterns. Continued research and assessment work in this area is required. Problems which also need to be investigated include effects on land/sea ice, sea level, sea surface temperatures and feed back effects which may determine CO<sub>2</sub> equilibrium levels and global climate.

A joint assessment of the CO<sub>2</sub> - climate issue was made by WMO, UNEP and ICSU in Villach (Austria) in 1981 and a second joint assessment is planned for October 1985 in the same place.



- Other radiatively active gases and climate change: There is increasing evidence that the cumulative effect on climate of increasing concentrations of radiatively active gases (other than CO<sub>2</sub>) such as O<sub>3</sub>, CH<sub>4</sub>, NO<sub>x</sub> may be of the same magnitude as that of CO<sub>2</sub>. Further research studies, including photo-chemical interactions which affect the concentration of these gases are needed. As regards O<sub>3</sub>, WMO was designated by UNEP as the international lead agency for the physics and chemistry considerations of the ozone layer. The WMO Global Ozone Research and Monitoring Project was authorized in 1976.
- Natural climate system variability: A considerably better understanding of "natural" climate system variability is of utmost importance. The accruing knowledge on CO<sub>2</sub> and other radiatively active gases, must be accompanied with a more precise understanding of natural climate system changes to bring about a substantial progress in climate prediction. The underlying assumptions which purport to make these issues separable need to be carefully examined. Several activities to better understand and model climate system processes to determine the predictability of climate are being undertaken by the World Climate Research Programme.
- Impact assessment methodology: Continued stress needs to be placed on improving methods to assess the social and economic impacts of potential climate change. Methodology should be developed both for regional and global applications and preferably using coupled component models (to handle interrelated discipline areas). Until accurate climate prediction becomes a reality, impact assessment techniques should be flexible to permit rapid updates and re-assessments. Multi-disciplinary research will be required. The World Climate Impacts Studies Programme being implemented by UNEP strives to achieve these objectives.

## 2. Climate System Monitoring

The atmosphere-ocean-cryosphere-land surface/biosphere system is complex, interdisciplinary, and interactive. Both internal and external processes contribute to climate system fluctuations which result in series of weather events which affect all social and economic activities. The recent 82/83 El Niño/Southern Oscillation (ENSO) event, with associated impacts (floods, droughts, extreme weather) world wide, is one example of a significant climate system fluctuation - in this case primarily through atmosphere-ocean feedback processes. Persistent climatic "anomalies" could lead to social/economic disruption from which recovery is often difficult. To aid governments in planning and in decision making it is crucial that the climate "system" be judiciously monitored, and simple, concise information be made available which provides an understanding of the present state of climate and possible clues to cause/effect relationships and consequences/impacts. It is necessary to monitor physical variables as well as other macro-indicators (e.g. fluctuations in desert margin zones, vegetation cover, land/sea ice, aerosols/pollution-CO<sub>2</sub>, solar variability, and geophysical parameters - earth's rotation changes, volcanic eruptions). Reconstruction of past climate variation would provide perspective to present climate fluctuations.

A strong effort in this area is warranted due to the currently decentralized or fragmented state of information availability. In the future, improvements would be necessary to data acquisition and data management systems. Integrated into the activity should be mechanisms for the free and timely flow of concise information - particularly those concerning the onset of significant large-scale climatic anomalies of social and economic consequence. The regional and global monitoring of drought and desertification processes should also be undertaken. A "Climate System Monitoring" activity has been initiated under the World Climate Data Programme with support from UNEP/GEMS.

### 3. Environmental Pollution

Environmental pollution has and will be a problem that must be addressed. Improved observing/monitoring systems must be stressed as well as models to determine pollution trajectories and distribution characteristics. Also necessary is to ensure the required information flow and to establish international standards for pollution control related to environmental factors which influence dispersion, fallout and absorption rates.

- Acid rain: Industrial emission and the burning of fossil fuels are a major source of SO<sub>2</sub> and other gases which are photochemically converted to acids and deposited on the earth through rain. There is substantial evidence that acid rain is causing considerable damage to terrestrial and aquatic biota and altering soil characteristics, besides eroding buildings and historical monuments. The issue is of international concern since acid rain at a particular location can be caused by the emission of pollutants into the atmosphere from far removed source points. There needs to be research studies undertaken, agreements between countries and the establishment of pollution control standards to limit the problem.

To monitor acid rain and other pollutants on the global scale, the WMO Environmental Pollution Monitoring and Research Programme, in collaboration and support from UNEP coordinates the operation of the Background Air Pollution Monitoring Network (BAPMON). The network presently consists of 200 regional and baseline stations in 65 countries with about 30 more countries planning to join this programme. The main goals of BAPMON are to obtain continuously climate- and environment-related data using standardized measurement methods; to assure data quality and to assist participants in implementing monitoring programmes which include determination of the chemical composition of wet precipitation, observations of atmospheric turbidity, monitoring the concentration of suspended particulate matter of CO<sub>2</sub>, and of some other parameters.

- Long-range transmission of atmospheric pollutants: Long-range and transboundary pollution transport is a problem of significant concerns. Monitoring and research of the subject as well as agreements between countries to limit the problem are necessary. Within the Co-operative Programme for the Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) WMO, with support from UNEP, is responsible for the meteorological aspects of EMEP and is in charge of two Meteorological Synthesizing

Centres (MSCs) with the aim of improving computational models for the assessment of transboundary fluxes and deposition of certain pollutants. The MSCs regularly distribute the results obtained. It is envisaged to extend the programme to some other regions.

- Air pollution interaction with other media and meteorological aspects of air pollution. With UNEP support, WMO activities which address this issue, include studies on Marine Pollution and the Interchange of Pollutants between the Atmosphere and the Oceans; Multi-media and integrated monitoring (IM) of environmental pollutants, their interchange between the atmosphere, oceans and other media; and meteorological aspects of atmospheric pollution in impact level areas (near sources and at high levels of pollution). Two international symposia on IM were organized (in 1978 and 1981) in co-operation with UNEP and Unesco. Another symposium including this subject is planned to be held in 1985.
- Marine Pollution: Oil spills from ocean tankers cause considerable marine pollution with adverse effects on marine and land surface (shore-line) biota. Under the Marine Meteorological Services Programme of WMO a specialized forecast service is maintained for pollution monitoring and clean-up operations. These services are defined in the appropriate Manual on Marine Meteorological Services published by WMO. The purpose is to provide meteorological support for this important environmental activity, which is specifically relevant to the UNEP Regional Seas Programme.

An important example of the close cooperation between WMO and UNEP is the direct interconnexion between the Regional Meteorological Programme and the Kuwait Action Plan.

#### 4. Other Environment-related Issues

- Desertification, deforestation, soil erosion: Desertification can be caused by a variety of natural and man-induced factors such as: climate change - persistent changes in the large-scale circulation; mis-management of marginal lands; changes in land-use, surface albedo and moisture re-cycling mechanisms; and/or a combination of these factors. Contributing to the above are increasing population pressures; urbanization and decreased mobility of societies; and economic/social/political instability leading to short-term planning and decision making. Deforestation can lead to altered micro/meso climate conditions; reduced moisture availability, erosion and eventually desertification.

Concerted studies are required to develop methodology to combat wind/rain induced erosion and desertification; to develop

strategies whereby societies can react to changing climate environments; and to transfer technology/techniques to regions which need assistance. Multi-disciplinary research, practical applications through demonstration projects, and improved dissemination of simple concise information are needed to improve the awareness of governments. Conceivably, effective expert teams could visit countries/regions where drought and desertification are major problems; make preliminary assessments on the compatibility with available climatic and other natural resources of past/ongoing/planned activities; and propose implementation strategies to avert catastrophic consequences in the future. International assistance to selected (worst-case) countries could serve as models. Activities under the World Climate Applications Programme and WMO's Agrometeorological programme address these needs.

- Weather Modification: The potential benefits from being able to modify weather (e.g. enhance or re-locate rainfall, suppress hail) are clear. However, there is a need for basic research and practical studies to develop weather modification operational capabilities, and to assess the possible environmental side effects. The ongoing and planned activities under the Weather Modification Programme of WMO address these requirements.
- Possible climatic consequences of nuclear warfare: An exchange of nuclear weapons would emit large quantities of particulate and gaseous pollutants into the troposphere and stratosphere. Recent numerical model experiments suggest that the climatic consequence of such emissions on the radiation balance of the earth could be catastrophic. For example, through blocking solar radiation it is believed that a series of all-year "nuclear" winters is possible. The subject is being investigated by WMO and ICSU.

## 5. Environmental and development strategies

Promoting the use of ecologically viable policies in both developed and developing countries is a challenging task. Substantial, though fragmented, information already exists - this would need to be carefully synthesized into concise but comprehensive proposals to guide governments. Well produced television documentaries, radio shows, newspaper articles and the introduction of environmental studies in schools at an early stage would contribute significantly to improved public awareness. "Case studies" and examples of how not to implement projects should be publicised. Such information should be widely disseminated.

# INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

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September, 1984

The International Council of Scientific Unions (ICSU) welcomes the initiative taken by the United Nations to establish the World Commission on Environment and Development, and regrets its inability to be represented at the Commission's first meeting. ICSU particularly welcomes point 9 of the Resolution (38/161) adopted by the United Nations General Assembly, which encourages the Commission to inter alia "maintain an exchange of views with the scientific community."

The International Council of Scientific Unions is a federation of 20 International Scientific Unions, 17 Scientific Associates, 70 National Members (academies of sciences, national research councils and such), and over a dozen interdisciplinary committees and commissions. ICSU was created in 1931 for the principal objective of encouraging international scientific activity for the benefit of mankind. It does this by initiating, designing and coordinating international scientific research projects; the International Geophysical Year and the International Biological Programme are probably the best known examples.

Many of the Members of ICSU are particularly concerned with the problems of the environment and development. Although it is not the intention of this paper to provide an exhaustive list or a description of these, it may be of interest to cite some examples of such activities to give an idea of the range and scope of ICSU's involvement in these issues. Such examples would include the work of the ICSU Scientific Committee on Problems of the Environment (SCOPE) in biogeochemical cycles, ecotoxicology, land transformation, dynamics of continental wetlands and water bodies, and the environmental consequences of nuclear war; the International Union of Biological Sciences (IUBS) Decade of the Tropics programme; the International Geographic Union's (IGU) work on environmental cartography; the Scientific Committee on Oceanic Research's (SCOR) involvement in the study of climatic changes and the ocean and ecological theory in relation to biological oceanography; and ICSU's collaboration with the WMO on the World Climate Research Programme. Other examples

include the International Biosciences Networks projects on the comparison of African and Latin American savanna ecosystems and on the parasitic weed Striga; the Commission on the Application of Science to Agriculture, Forestry and Aquaculture's (CASAFA) and the International Union of Nutritional Sciences' (IUNS) work related to nutrition and food production, as well as the Committee on the Teaching of Science's activities related to science and technology education and future human needs.

It should be noted that many of these activities take place in developing countries, and that in addition, many ICSU bodies carry out ongoing training activities in developing countries and sponsor travel fellowship and exchange programmes, all for the purpose of strengthening the scientific infrastructure in developing countries.

In addition to the examples of ongoing activities provided above, ICSU is sponsoring a scientific symposium on "Global Change" on 25 September of this year, at the time of ICSU's 20th General Assembly. The Global Change Symposium is a part of a systematic, longer term exploration by ICSU and its constituent bodies to consider a proposal to launch an international, interdisciplinary programme to study global change in the terrestrial environment (geosphere) and the life that inhabits it (biosphere) as a closely coupled system. This programme would augment established national and international programmes to illuminate the processes that govern the behaviour of the oceans, atmosphere, lithosphere, biosphere and the solar terrestrial domain, by addressing the interfaces among them.

It is the earnest hope of the International Council of Scientific Unions that the World Commission on Environment and Development will collaborate with the international scientific community which has for so many years been intimately involved in searching for solutions to environmental problems. It is also our hope that duplication of efforts will be avoided in the work of the Commission and in the work of other existing bodies such as ours. We are convinced that the problems to be treated are large enough for a number of organizations and individuals to be working toward their resolution. It would however, be a shameful waste of resources and time if the same questions were asked in different places and by different bodies, with no communication among these.

We stand ready therefore to provide the World Commission with additional information and assistance, and we look forward to the future fruitful collaboration between our organizations.

**CONSERVATION OF LIVING RESOURCES:  
A CRUCIAL ISSUE FOR THE WORLD COMMISSION ON ENVIRONMENT  
AND DEVELOPMENT**

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**1. INTRODUCTION**

The World Conservation Strategy was published in 1980 to provide a set of principles for guiding the integration of conservation with development (Annex 1). The WCS points out that human activities are progressively eroding the Earth's capacity to support life at the same time that growing numbers of people and increasing levels of consumption are making ever greater demands on the planet's resources. The combined destructive impacts of a poor majority struggling to stay alive and an affluent resource-consuming minority are inexorably and rapidly eroding the buffer that has always existed, at least on the global scale, between human resource consumption and the planet's productive capacity.

This erosion of the planet's life-support systems is likely to continue until methods of development come more into line with the realities of the Earth's resource capacities and processes, so becoming sustainable in the long term. The problems of living natural resources cannot be separated from the larger issues of social and economic development.

However, IUCN would like to address more particularly certain aspects of the issue of conserving living natural resources. This is where we have specialized expertise and where considerable improvement is required if these resources are to realize their potential for contributing to human welfare.

**2. THE BENEFITS TO BE GAINED FROM CONSERVING LIVING RESOURCES**

The many good reasons for conserving living resources can only be summarized in this short presentation:

- \*\* Further advances in biological sciences depend heavily on the preservation of wild species as the basic material from which discoveries of new biological processes and substances will be made.**
- \*\* Breakthroughs in molecular biology and genetic engineering offer tremendous promise for the future. The genes of wild species will be essential raw material or blue prints for future applications.**

- \*\* To feed, clothe, house and fuel the human population of the next century, a considerable increase beyond present farm and forest productivity will be required. This can only be achieved by increasing present yields or by bringing new land, mostly marginal land, under cultivation. In both cases many of the adaptive qualities that will be required from cultivated plants and (to a lesser extent) from domestic animals, will be drawn from the genes of wild species.
- \*\* Many industrial and medical products are of natural origin or have been synthesized on the basis of natural models. As our knowledge of wild species increases, so will the number of marketable products derived from them.
- \*\* Many species play key roles as pollinators, seed dispersal agents, sources of food or decomposers of dead matter. Their disappearance or depletion may have far-reaching consequences on the ecological balance of natural and man-made ecosystems.
- \*\* Natural ecosystems such as forests, wetlands, mangroves or coral reefs play an extremely important part in maintaining and regularizing water supply, preventing erosion, absorbing environmental pollutants, protecting the coastline against storms, and providing essential habitat to marketable species.
- \*\* In addition to these utilitarian reasons, there are also strong ideological arguments in favor of the conservation of living resources, among them: man's moral responsibility to not knowingly set back the course of evolution in an irreversible way; the right of species to exist regardless of any usefulness to man; the importance of the enjoyment of nature to our sanity and well-being.

### 3. OBSTACLES TO CONSERVING LIVING RESOURCES

There is ample knowledge available to solve most of the problems surrounding the management of living resources. What has been lacking is the means to solve the problems and the political will to implement these means.

Major obstacles which will have to be overcome if living resources are to be conserved are lack of an economic framework which favours conservation, lack of awareness of the problem, lack of adequate information, lack of institutional capacity and lack of funds.

#### 3.1. The economic framework

The economic systems which seek to regulate today's world have been slow to take account of the value of living resources, except in terms of direct consumption or export commodities. Only a small proportion of wildlife and habitat resources are so recognizably valuable as to spark sustainable management practices through the workings of prevailing economic systems.



Global life-support systems and the majority of wild species do not have a value that can be easily quantified and reflected in economic systems, models, or cost-benefit analyses of alternative development plans.

### **3.2. Awareness of the problem**

What is at stake is no longer the loss of a few species of vertebrates but of hundreds of thousands, perhaps millions, of animal and plant species belonging to all taxonomic groups as well as of a large number of the remaining natural ecosystems of the earth. Awareness of the magnitude of the problem is very recent, even among scientists. It is essential that decision makers and the public be informed and convinced of the importance of the matter.

### **3.3. Making information available**

There is a need to facilitate decision making by providing reliable information on the conservation status of species and ecosystems, including the probable effects of proposed human activities on these features of the natural environment.

- Such information is still sketchy and the full picture will only emerge after much further research. Systems for monitoring the status and trends of, at least, key species and natural ecosystems will have to be established.
- Information on the anticipated effects of human activities on biological diversity will have to be obtained through environmental impact assessments, and guidelines developed to assist the adoption of mitigative measures. Of particular importance would be prior analysis of the effects of economic policies, particularly agricultural policies, as well as of bilateral or multilateral foreign aid projects.

### **3.4 The institutional capacity to conserve**

The development of strong national and international institutions with clear mandates and powers to preserve biological diversity will be necessary if appropriate land-use planning and adequate environmental safeguards are to be adopted and effectively implemented. Such institutions will have to be staffed by competent environmental managers, who are at present in very short supply. To remedy this situation, many more training courses for managers of living resources will have to be organized.

At the international level there may be a need to conclude a world treaty on the preservation of biological diversity and to strengthen and expand present cooperative activities.

### **3.5. Funding conservation of living resources**

Nowhere is the level of funding sufficient to provide for the preservation of the full range of biological diversity which is obviously required. This is the direct consequence of the lack of awareness and institutional capacity mentioned above. Moreover, it should be remembered that a large majority of the world's species inhabit tropical countries which have extremely limited financial resources. As all countries of the world, however, stand to benefit from the preservation of living resources, it would seem logical to establish an international funding mechanism to provide for an equitable sharing of conservation costs. Contributions from the users of wild species or of products derived from wild genetic resources could assist in providing the necessary funds.

Financial and technical assistance should also be provided by bilateral and multilateral aid sources for the specific purpose of living resources conservation projects. At present, even where funds are available for such projects, states often do not apply for them as they feel that they should give priority to more immediate development concerns such as famine relief. Aid funds specifically earmarked for conservation projects could assist in resolving this problem.

## **4. SUGGESTED ACTION FOR THE WORLD COMMISSION**

The World Conservation Strategy puts forward the priority requirements for achieving each of the main objectives of living resource conservation. These include both national actions, to be carried out by each country, and international actions, to be carried out bilaterally or multilaterally.

### **Priority national actions**

- \*\* Preparation and implementation of national and/or subnational conservation strategies;**
- \*\* Adoption of preventative environmental policies and cross-sectoral conservation policies;**
- \*\* Inclusion of non-market indicators of conservation performance in national accounting systems;**
- \*\* Advance assessment of the likely environmental effects of all major actions;**
- \*\* Adoption of a procedure for allocating land and water uses based on ecosystem evaluation and environmental assessment;**
- \*\* Review and strengthening of legislation concerning living resources to ensure that it provides sufficiently for conservation, paying particular attention to enforcement;**

- \*\* Review and improvement of the status, organization, funding and staffing of agencies with responsibilities for living resources;**
- \*\* Review and strengthening of training facilities at the professional, technical, and user levels;**
- \*\* Rural development combining short-term measures to ensure human survival with long-term measures to safeguard the resource base and improve the quality of life.**

**Priority international actions**

- \*\* Review of the coverage and effectiveness of international law relevant to living resources, development of new law to remedy any deficiencies, and implementation of international conservation conventions;**
- \*\* Multilateral and bilateral assistance for reforestation, restoration of degraded environments, and protection of the natural support systems of fisheries and of genetic resources;**
- \*\* Multilateral and bilateral assistance for the design and implementation of ecologically appropriate policies and the establishment and maintenance of effective conservation procedures, laws, and organizations;**
- \*\* Cooperative programmes for conservation of tropical forests; drylands; wetlands; and the on site protection of the wild relatives of economic or useful species, of threatened species, and of ecosystems of exceptional diversity.**

**From this agenda for action, several specific activities for the Commission's attention can be derived:**

- \*\* To launch a consciousness-raising exercise to bring the issue to the attention of policy makers and the public at large. A primary goal of this exercise needs to be a broader-based understanding of how seemingly unrelated areas of activity such as trade policy and interest rates can have severe and detrimental effects on living resource conservation; and, conversely, how living resource conservation can contribute to human welfare and national security.**
- \*\* To examine the economics of living resource conservation, including systems for assigning values to gene pools, species, ecosystem processes (such as watershed protection), and protected areas; the kind of incentives and assistance which would effectively encourage the protection of native flora and animal habitats; economic significance for countries of the protection of key habitats such as wetlands; and exchange of information on the practices of countries in the use of economic incentives in the conservation of living resources and natural habitats.**

- \*\* To establish systems for monitoring status and trends of key species and natural ecosystems.**
- \*\* To promote increased understanding among aid organisations that maintenance and management of a functioning ecosystem is a pre-requisite for sustainable development. The aim of this activity will be to effectively demonstrate that the long-term economic viability of most development projects is dependent upon early identification of both the positive and the detrimental effects which such development will have on the resource base and promotion of measures necessary to promote the positive effects and mitigate the negative effects.**
- \*\* To encourage and assist in the preparation of National Conservation Strategies (NCSs), as a valuable way to help countries find their own paths toward sustainable development. In particular, promotion of the national rather than the local benefit of specific resources, e.g., the role of forests in watershed protection and the critical role of freshwater and coastal wetland systems as nursery areas of commercial fish stocks. By the beginning of 1984, over 30 countries were preparing or had prepared national or sub-national conservation strategies.**
- \*\* To extend and make more secure the network of parks and reserves to effectively cover all ecosystem types and essential genetic resources, and to develop the requisite management plans needed to turn a piece of land into an effective conservation instrument which brings sustainable benefits to people. Such plans need to include management practices which minimize the conflicts and possible detrimental effects between nature reserves and neighbouring land uses. While not a panacea, effectively managed protected areas can provide the strongest possible protection to species and ecosystems which are managed elsewhere for direct utilization.**
- \*\* To develop ways and means of conserving living resources outside protected areas, using such techniques as easements, public incentives, enforceable regulations, and others.**
- \*\* To develop a better understanding of the lessons that can be derived from current efforts at protecting living resources. This should include investigating the successes and failures of international legal instruments and alternative forms of development assistance as they affect living resource. For example, many European countries promote the export of expertise in dam or polder construction without due consideration of whether this leads to a programme for sustainable use of the water resources of developing countries; studies in Senegal and Egypt suggest that this is not always so and that ecologically sound alternatives need to be identified.**

The potential scope for action by countries in conserving living resources is of course much broader than this. As we have seen, many seemingly unrelated national policies have major impacts on living resources. These impacts need to be better understood and addressed. The development of more effective institutional infrastructures is also sorely needed and can best be accomplished at the intergovernmental level.

The World Commission on Environment and Development can also have a very beneficial role in promoting a better understanding among national agencies, such as economic ministries and treasuries, of the importance of a far greater governmental commitment to conservation, including in the form and allocation of development aid.

IUCN in its continuing work to implement the World Conservation Strategy would be pleased to assist the Commission, if it so wishes, in developing these ideas further and in contributing to the development of ways and means of ensuring that living natural resources can make a major contribution to sustainable modes of development.

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