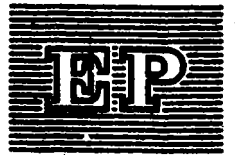




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### THE PROPOSED PROGRAMME

#### Note by the Executive Director

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## ABBREVIATIONS

ALECSO	Arab League Economic, Cultural and Scientific Organization
CMEA	Council for Mutual Economic Assistance
CORE	Common Register of Development Activities
CSAMC	Commission on Special Applications of Meteorology and Climatology
CSIRO	Commonwealth Scientific and Industrial Research Organization
ECA	Economic Commission for Africa (United Nations)
ECE	Economic Commission for Europe (United Nations)
ECLA	Economic Commission for Latin America (United Nations)
ECWA	Economic Commission for Western Asia (United Nations)
EEC	European Economic Community
ESCAP	Economic and Social Commission for Asia and the Pacific (United Nations)
FAO	Food and Agriculture Organization of the United Nations
GARP	Global Atmospheric Research Programme
GATE	GARP Atlantic Tropical Experiment
GATT	General Agreement on Tariffs and Trade
GEMS	Global Environmental Monitoring System
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Pollution (IMCO/FAO/UNESCO/WMO/WHO/IAEA/United Nations)
GIPME	Global Investigation of Pollution in the Marine Environment
IAEA	International Atomic Energy Agency
IAHS	International Association of Hydrological Sciences
IAMAP	International Association of Meteorology and Atmospheric Physics
ICSPRO	Inter-Secretariat Committee on Scientific Problems Relating to Oceanography
ICSU	International Council of Scientific Unions

IDB	Inter-American Development Bank
IFIAS	International Federation of Institutes for Advanced Study
IGOSS	Integrated Global Ocean Station System
IIASA	International Institute for Applied Systems Analysis
IHD	International Hydrological Decade
IHP	International Hydrological Programme
ILO	International Labour Organisation
IMCO	Intergovernmental Maritime Consultative Organization
IOC	Intergovernmental Oceanographic Commission
IRPTC	International Registry of Potentially Toxic Chemicals
IRS	International Referral System
ISO	International Standards Organization
ISSS	International Society of Soil Science
ITC	International Trade Centre UNCTAD/GATT
IUBS	International Union of Biological Sciences
IUCN	International Union for Conservation of Nature and Natural Resources
IUGG	International Union of Geology and Geophysics
MAB	Man and the Biosphere Programme (UNESCO)
OECD	Organization for Economic Co-operation and Development
ORSTOM	Office of Overseas Scientific and Technical Research (France)
OTS	Organization for Tropical Studies
SCOPE	Scientific Committee on Problems of the Environment of ICSU (q.v.)
SCOR	Scientific Committee on Ocean Research
SIDA	Swedish International Development Authority
UNCTAD	United Nations Conference on Trade and Development

UNDP	United Nations Development Programme
UNDRO	Office of the United Nations Disaster Relief Co-ordinator
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNISIST	World Science Information System
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization

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## I. INTRODUCTION

### A. STRUCTURE OF THE REPORT

1. In most respects, the structure of this report follows that of the corresponding report to the Governing Council's second session (UNEP/GC/14/Add.2). However, in a number of cases the Executive Director felt that departures from that structure would be desirable. The changes are indicated, and the reasons for them briefly stated, in the following paragraphs.
2. The priority subject area "Human Settlement, human health, habitat and well-being" has been divided into two parts, "Human settlements and habitat" and "Health of People and of the environment". This decision as well as the change in the second title, were made in the interests of clarity of presentation. "Pest management systems", as recommended by the Governing Council, are dealt with under health; the approach being taken to them is in fact similar to that being taken to endemic diseases.
3. As recommended by the Governing Council, the material formerly presented under the headings of trade, economics, technologies, rational use of earth resources, eco-development and alternative strategies for development and environment has been reorganized. This has been done by regrouping the material under the heading "Environment and development"; it is hoped that this rearrangement will help to clarify the issues involved.
4. The two priority subject areas "Land, water and desertification" and "Conservation of nature, wildlife and genetic resources" have been brought together under the heading "Terrestrial ecosystems, their management and control", since it is felt that all of the subjects with which they deal should be considered together as aspects of ecosystem management.
5. In response to a request made at the informal consultations in New York in December 1974, "Natural Disasters" has been transferred from the chapter on "Development of the Programme" to that dealing "Priority subject areas".
6. Brief additional sections on "Trees", "Development of offshore resources" and "Antarctica" have been included under the heading "Development of the Programme".
7. It has not proved practical to indicate in the text of this document all of the cross-references between the various sections that are required by the relationships among the various parts of the Programme. An example is however given in the section on water (paragraph 84 (j)). In addition a table of references indicating connexions between various parts of the document will be available. This may be used to see some of the internal connexions that are considered to be important, but which it is difficult to indicate in the text of the report.

### B. A CONCEPT OF THE PROGRAMME

8. UNEP is needed because sectors think and act sectorally and disciplines think and act within their own confines. The environment problem is an "all of the earth" problem. Difficulties have arisen from, and been marked by, the failure of sectors and disciplines to consider and act in concert with other sectors and disciplines. Someone is needed to consider, to be a focus for, and to lead action in matters that are, by the systems nature of the environment, cross-sectoral and interdisciplinary.



9. The central questions, neglect of which leads to most environmental difficulties, are: what is the system, what are its boundaries, and who is responsible for it. In the light of these questions, problems of pollution, conservation, endangered species, trade, and development have a similar structure. The "Tragedy of the Commons" <sup>1/</sup> arises from lack of responsibility for the commons itself: what belongs to everyone may be the responsibility of no one. UNEP has particular responsibilities for watching over the environment of the global commons, and these responsibilities provide the focus for its programme.

10. UNEP's programme should consist of action in areas where the systems nature of environmental issues can be exemplified and the systems approach reinforced, and where its co-ordinating role (perhaps reinforced by its resources) can make system efforts out of separate sector and discipline efforts. This role forces it to make everything seem more complicated from the standpoint of a given sector or discipline, i.e. as complicated as the problems really are. UNEP is thus a 'complexifier', to use a recently-coined word.

11. The above comments make it clear what the major emphasis in UNEP's programme should be - on those cross-sectoral and cross-functional tasks that are not being undertaken by those with sectoral responsibilities (or not being adequately undertaken), or on those things that simply do not appear in the normal sectoral assignments.

12. The first category of cross-sectoral matters consists of those that are driven by global system characteristics as well as by their cross-sectoral nature. The primary examples in this category are GEMS and IRS, which by their nature communicate measurements and information of different kinds from everywhere, and are thus inter-sectoral and global in character.

13. A second category of cross-sectoral problems consists of those that are driven by the eco-region nature of the problem, so that the work to be done is dominated by geographic necessity, and the activities of the individual sectors contribute to work on a geographic system. Clearly, the subject of oceans is dominated by such programme activities, and in fact it will be tackled first in an eco-region way with emphasis on the Mediterranean. The programmes in eco-systems, particularly arid lands and tropical forests, also have this characteristic.

14. A final cross-sectoral category contains those situations in which the principal driving force is the systems characteristic of the problem. For some of these it may be said that sectoral approaches have led to distortion in the attack on the problem and it is UNEP's task to bring a system balance back into the programme. This is true, for example, of attacks on endemic diseases of an environmental nature such as schistosomiasis and malaria, as well as certain crop pests. In these cases, the attacks on the disease appear to have been based on purely medical or pesticidal techniques, without adequate consideration of the total ecological character of the diseases. The same may be said to be true of human settlements, where inadequate examination of

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<sup>1/</sup> HARDIN, G., Science (1968) 162, pages 1243-1248.

interrelations between settlements and the surrounding environment and inadequate consideration of settlements as artificial ecosystems have led to major problems.

15. Even the questions of responsibility for endangered species and genetic resources (different aspects of the same problem) may be seen in a system context, as a counter to the losses occasioned by the search for immediate yield improvements through more and more highly focused monoculture agriculture. It has begun to be clear that the simplification inherent in this monoculture approach has led to decreased ecosystem stability against pests, climate and weather fluctuations, etc. and thus preservation and conservation matters are seen as components of future ecosystem construction and reconstruction.

16. Pollutants, which have been viewed almost entirely as noxious side-effects, should really be considered more intimately as products of unbalanced or imperfect industrial and other systems, as has been begun in projects with UNIDO.

17. The problem of development in harmony with environmental characteristics involves all sectors and requires a strong systems approach that considers all aspects of the many problems involved.

18. The problem of cross-connexion referred to in the simple classification above persists even in the construction of the programme itself. Some rearrangements of the subjects under various Governing Council priority areas have been made in an effort to group programme activities in a way that would make the cross-connexions most clear, but it is impossible to find an arrangement that simplifies all of these. As a result there remain problems of cross-linkage in the programme itself. These must be dealt with managerially by interaction in the Programme Bureau. Important examples include the matter of water quality (which is of concern in human settlements, in the work in eco-regions, and as an aspect of the pollutant problem), as well as the clear connexion between the programme for the Mediterranean, the programme for the arid lands surrounding the Mediterranean, and work to be done on human settlements, some of which are part of both the Mediterranean and the arid lands problem.

19. It is not practical to lump all of the individual programmes into a fully comprehensive super-programme, nor is it sensible to orient the system programme by sectors, although sectoral classifications always look simpler and clearer. Instead, the programme tries to preserve the system approach throughout, even though this leads to occasional arbitrariness in the definition of particular system programme activities. This has also led to the classification of certain sectoral elements as part of the programme activities of several appropriate systems. Water has been mentioned, but it should also be noted that soils and genetic resources, too, are partly treated in this manner.

20. The implication of the above considerations for technical assistance and training is that the basis of UNEP policy in these subjects should be to ensure that all Governments are able to participate in and derive full benefit from the system programmes and have the necessary internal basis for doing so. Thus, a large proportion of technical assistance and training activities should stem from the system programme activities and be designed to increase the base of participation in them. Another portion of technical assistance and training would take responsibility for more general provisions of base, such as matters of administration and law.

21. The above comments imply the meaning of "co-ordination" as it will be used by UNEP. In the UNEP context, it is not simply a matter of minimizing overlap or conflict, or even of plugging gaps, but rather an attempt to maximize the number and kinds of relevant contribution and to attempt to ensure that the relevant complications are all at least considered before the problem is simplified in an attempt at solution. Such a task implies a considerable amount of interagency, intergovernmental and inter-organizational action in planning, and indeed UNEP's principal line of work will be setting up such interactions and carrying them through to co-operative action.

22. In some cases, the existence of UNEP and its attitude and interests may be sufficient to stimulate the necessary actions. In other cases, direct organizing action by UNEP may be required. In some situations, the stimulative effect of the Fund of UNEP will be needed.

23. Finally, it must be noted that it has been necessary to concentrate on particular subjects or particular geographic matters in order to define achievable programme objectives. The expectation is that as these programmes are started and begin to reach fruition there can be a shift in emphasis, so that in time, various ecosystems and eco-regions and different kinds of system problems will be covered.

## II. PRIORITY SUBJECT AREAS

### A. HUMAN SETTLEMENTS AND HABITAT

#### Introduction

24. UNEP has been called upon to intervene in the area of human settlements and habitat because of the increasing awareness on the part of Governments that living conditions in many cities and villages, primarily in developing countries are deteriorating. It is well recognized that human agglomerations, whether rural or urban, have a vital role to play in the process of development. For a variety of reasons, the present systems of human settlement are not contributing to the full extent of their potential to improving economic and social conditions.

25. The primary objective in this component of the Programme is therefore to ensure the better integration of the human settlement system in national and regional development. A secondary objective is to gain a better understanding of the operation of human settlements as an ecosystem, and of the myriad interactions between this sub-system

and the larger ecosystem in which it is embedded, with a view to ensuring that these conditioning factors are taken into consideration in the planning, development and operation of human settlements.

#### 1. General development of human settlements

##### Objectives

26. The main aim of this element of the Programme is to ensure that a comprehensive approach is taken to solving the human settlements problem, including technological, administrative, legislative, economic, social, ecological and spatial solutions aimed at harmonizing the interplay between the factors that contribute to the satisfaction of man's needs and aspirations.

27. To achieve this integrated approach and to ensure its proper application in the light of Governing Council decisions and directives, the following are the specific objectives:

(a) To assist Governments in formulating national human settlements and urbanization policies which take the environmental dimension into account in the context of overall national social and economic policies, and to encourage the setting up of the appropriate administrative machinery at the national and local levels;

(b) To initiate a continuous and co-ordinated training programme aimed at building up local expertise capable of applying national policies. This forum will be used to sensitize those who are responsible for the planning, development and operation of human settlements to the environmental dimension;

(c) To demonstrate on a pilot project basis the feasibility of the comprehensive and integrated approach to the improvement and upgrading of conditions in slums and marginal settlements;

(d) To co-ordinate the many activities in this field being carried out by national, regional and international organizations so as to avoid duplication of efforts and to ensure transfer of successful experiences between projects and programmes.

##### Strategy

28. The problems of human settlements have been dealt with largely on a sectoral and fragmentary basis. The weak link in the chain of events and resources that limits the ability of developing countries to solve the complex human settlement problems they face is the lack of the appropriate administrative machinery responsible for the planning, development and operation of human settlements. If we are to hope to make progress towards solving the human settlement problems that confront us today, programmes must be co-ordinated in such a way that they support and complement each other, rather than being isolated efforts.

29. The following strategy is envisaged:

(a) To develop and promote the concept of the human settlement as an ecosystem, research will be promoted into the principles by which this ecosystem operates, to provide the foundation for development and management of human settlements that do not conflict with other environmental systems;

(b) As a first step in formulating effective national human settlements and urbanization policies, the Programme will seek to point up the choices, opportunities and constraints involved, and then to identify new alternative approaches. In this connexion, efforts will be made to promote environmentally sound distribution of population between rural and urban settlements to safeguard against disturbances in the functional distribution of populations. Greater emphasis will be placed on community participation at the local level.

(c) Assistance will be given to individual Governments in formulating their national human settlement and urbanization policies. Many countries have already adopted such policies, and it is necessary to evaluate their effectiveness in the light of experience. Co-operation between developing nations must be increased so that they may gain experience more relevant to their own economic and social conditions. In this respect, the role of the regional economic commissions is vital;

(d) In close co-ordination with the above efforts, a continuing programme on the global level will be undertaken to train local personnel responsible for the planning, development and operation of human settlements. A network of regional institutions to undertake a continuous training programme for nationals of each region will be established and supported. These institutions should prepare a training package suited to regional and local requirements, on which they will base their instruction;

(e) Efforts will be made to gather, compile and disseminate information on successful and unsuccessful attempts at slum improvement, especially those employing low-cost means. The feasibility of integrating slum improvement into the general development of human systems on a national level will be demonstrated on a pilot project basis.

## 2. Human settlements technology

### Objectives

30. Human settlements should be so designed that the result is an ecologically sound settlement which takes full account of the local natural ecosystem. This entails, *inter alia*, appropriate water supply and waste disposal technologies, a communication network that links parts of the settlement system, and appropriate building technology, including materials, construction, and building design.

### Strategy

31. If the concept of the human settlement as an ecosystem is accepted, this modifies and conditions the technologies used in the development of human settlements. To ensure appropriate approaches, the international community proposes to make an effort in four directions:

(a) The development of environmentally appropriate technologies for low-cost housing suited to local economic, social and resource conditions with particular emphasis placed on self-help methods of housing construction;

(b) The systematic reduction in cost of urban institutional, services and infrastructure construction;

(c) The adoption of a systems approach to the solution of water supply problems. A particular effort should be made to remove the technological constraints that are hindering programmes designed to make safe water accessible to a greater proportion of the population in developing countries;

(d) The development of techniques of waste disposal adapted to local economic, social and natural resource conditions for use in high-density urban areas, especially where existing conditions are threatening human health. Existing technologies must be put to the test in real life situations.

## B. HEALTH OF PEOPLE AND OF THE ENVIRONMENT

### 1. Human and environmental health

#### Introduction

32. Since the first outbreaks of disease owing to mercury and cadmium demonstrated the danger of unintentional release of chemical substances to the environment, it has been gradually understood that the sectoral approach, based on isolated studies of environmental media (air, water, soil, food) or of individual sources (agriculture, industry, fuel), is insufficient for protecting man and his environment.

33. The concept on which UNEP is basing its strategy calls for a comprehensive "horizontal" approach to the study of the impact of chemical and non-chemical pollutants and of the pathways through which they reach the target. Such studies should go beyond the mere assessment of acute or chronic human toxicity to include all aspects of any environmentally significant effects, including the long-term effects of low doses.

### Objectives

34. Various agencies and institutions have already produced a wealth of knowledge on chemicals in the environment and will continue to do so 2/. Besides further studies, research and monitoring, the most urgent tasks at this stage are to:

- (a) Consolidate and evaluate existing knowledge;
- (b) Translate it into further measures to stop pollution at its source;
- (c) Elaborate internationally acceptable standards for primary protection (i.e. maximum acceptable level of pollutant in a target under specified conditions) and working limits (i.e. maximum acceptable levels of pollutants in specified media designed to ensure that under specified circumstances a primary protection standard is not exceeded).

35. In response to this need, the objectives of the programme will be:

- (a) To improve the basic health of man and his living environment (special attention will be given to improving water supply and waste disposal);
- (b) To evaluate any harmful effects on human health caused by chemical and non-chemical pollution of air, water, food and the working environment, and to assess the total exposure resulting from the various media. These activities will include analysis of the inadequacies of some technical processes;
- (c) Based on this information, to recommend measures to protect the health of people and the environment effectively;
- (d) To participate fully in work aiming at the control of the endemic diseases induced by specific environmental conditions.

36. In these fields, UNEP will endeavour to interest and engage all countries in co-ordinated global or regional action and to develop internationally valid and acceptable measures and standards with the assistance of specialized agencies, especially FAO, ILO and WHO.

### Strategy

37. The impact of the environment on human health derives from many factors:

- Physical agents, including radiation;
- Chemical and biological agents associated with all environmental media (air, water, land, food, habitat and place of work).

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2/ Concern for human health is implied directly or indirectly in almost every part of the UNEP programme. The programme for the protection of human health should, therefore, be seen as comprising not only those activities indicated in this priority area. However, the programmes of other priority areas that deal with human health are not repeated here.

38. All activities within this programme must therefore deal with the effects of external environmental conditions on human health and well-being, and must foster the application of preventive technology, especially in basic sanitation.

(1) Assessment of occurrence of pollutants in all media and their effects on human health and the environment

39. Assessment of the occurrence of pollution requires collection of data on levels of pollutants in the environment and the human body, their sources and their effects. Considerable data are already available through the work of WHO and of many countries and regional, governmental and non-governmental organizations. It should be recognized that pending the full development of GEMS, the data available for this purpose will not be perfect, owing to the lack of internationally accepted methodologies for monitoring and evaluation and the absence of adequate data. The following strategy is therefore proposed:

(a) Small groups of experts, acting in their personal capacity, as well as experts representing United Nations agencies, will analyse the data now available. As a test, this analysis will first be made for some isolated pollutant in all media;

(b) On the basis of the experience gained in this exercise, similar analyses will follow for other pollutants;

(c) Improved evaluations will be made later, as this programme gains its full momentum and when improved data become available under GEMS.

(2) Development of environmental health criteria

40. This activity is intended to provide Member States with essential information on the health effects of pollutants and other environmental hazards as a basis for planning abatement programmes, establishing national standards, and evaluating the effectiveness of control. Work in this area should aim at unifying the approach to establishing maximum permissible levels of human exposure, although special programme components will need to continue in each sector, i.e. air, water, food, the working environment, habitat and radiation. The main objectives of this programme will be:

(a) To evaluate available information on exposure to environmental pollution and other hazards;

(b) To provide guidelines for exposure levels (criteria documents);

(c) To stimulate relevant research;

(d) To promote standardization or development of methodologies for toxicological or epidemiological studies to identify potential pollutants and environmental hazards.



41. WHO has already made good progress towards these objectives and is elaborating health criteria documents in co-operation with national and regional institutions and with partial support from UNEP. Draft criteria documents have been completed for lead, mercury, cadmium, asbestos, carbon disulphide, and noise. Drafts are being prepared for PCBs, manganese, nitrates, nitrosamines and mycotoxins. In these criteria documents, no attempt has been made generally to elaborate international standards or derived working limits. The documents will be used as a basis for developing guidelines concerning the application of environmental health criteria in the planning, implementation and evaluation of national programmes for the control and abatement of pollution in all media. Countries may use these results for the development of standards.

42. To further this effort, the following strategy is proposed:

(a) Criteria documents will be prepared for a long list of additional priority pollutants, including acceptable levels in such non-human targets as domestic animals, wildlife, crops, certain areas of aquatic life, soil and forests;

(b) The scientific data on pollution will be translated into environmental policy decisions based on internationally acceptable procedures and risk-benefit and cost-benefit analyses, to help policy-makers in taking their decisions;

(c) Research will be carried out on means of combatting newly identified hazards to health.

43. These activities are seen as contributions to an eventual total assessment of the impact of pollution and to the implementation of pollution control.

### (3) International Register of Potentially Toxic Chemicals (IRPTC)

44. IRPTC will collect and make available information on environmentally significant characteristics of chemical substances. It is conceived as an international clearing-house for information on potentially toxic chemicals with the aim of ascertaining fair practice in the distribution and use of chemical substances. This is of importance to the chemical industry when developing new substances and especially to developing countries which depend on objective, preferably internationally accepted, description and evaluation of these substances.

45. Work on the establishment of this International Register has already been initiated by UNEP. An expert workshop was held in Bilthoven (Netherlands) in January 1975. On the basis of the report of the Workshop, and in accordance with Governing Council decision 8(II), the Executive Director recommends that:

- An International Register of Potentially Toxic Chemicals be established by UNEP with the following objectives:

(a) To facilitate access on a global basis to scientific and administrative data concerning potentially toxic and other environmentally significant chemical substances;

(b) To encourage international co-operation in determining the impact of chemicals on man and the environment;

(c) To encourage a more open relationship between industry and regulatory authorities, in both industrialized and developing countries, in order to make relevant data more readily available;

(d) To provide information concerning national, regional and global policies, regulatory measures, criteria studies; international standards and recommendations; and to serve as a basis for draft model legislation;

(e) To provide essential data for the operation of the early warning capability being developed within the relevant sections of the Programme;

(f) To develop - through action by IRS - a network for dissemination of information which participants wish to provide to IRPTC on environmentally significant chemical substances;

(g) To launch an intensive programme for a small number of substances, selected on the basis of their environmental importance, utilizing all available information on these substances to develop comprehensive and detailed central files.

- An expert task team should be convened as soon as possible to develop detailed plans for pilot projects as recommended by the Workshop;

- A full report on the operation of the Register should be provided for consideration by the Governing Council at its fifth session, following a progress report to the fourth session including proposals for full operation.

(4) Development of indices for monitoring environmental health and epidemics

46. The objective of this activity is to understand and quantify the linkages between specific environmental exposures and selected adverse health effects. The complexity of this problem can be appreciated by considering that acute or chronic damage to health may follow single or repeated peak short-term exposures or lower long-term exposures; furthermore, a single environmental agent may contribute either to inducing or to aggravating several different adverse health effects, and multiple environmental agents may contribute to increased risk for a single clinical entity.

47. To this end, a programme is envisaged to improve epidemiological surveillance of the health effects of adverse environmental conditions and the methodology for assessing epidemiological data in correlation with environmental data.

48. The scientific and technical details of the programme in this area will be developed on the basis of recommendations by a scientific group to be convened jointly by UNEP and WHO with participation of other organizations. WHO has already begun work on outlining activities in this area.

(5) Other programme activities

49. Special attention will be given to:

(a) Development of a multi-national programme for monitoring and research on food contaminants to be based on recommendations of an expert group meeting held in October 1974 jointly with FAO and WHO.

This development effort will be supported by a complete case study of the significance of mycotoxins, leading to recommendations on prevention of their occurrence and on elimination processes.

To enable developing countries to benefit fully from these programmes, UNEP will co-operate with FAO in establishing regional health and food control services. A special feature of these programmes is training personnel for these services in developing countries.

(b) Prevention of harmful effects to human health of radioactive contamination from all sources

This effort requires international co-operation for the long-term management of radioactive wastes and the establishment of a register of releases of significant radioactive material into the biosphere, as well as a register of the disposal of radioactive wastes. Within this area, radiological standards will have to be updated as our knowledge improves, and derived working limits established. IAEA will have a major role to play in this respect.

(c) Development of a United Nations Environment Statistics Programme

Statistics programmes of the United Nations system will be utilized in this effort and the environmental dimension in such programmes will be strengthened.

This work is already under way. It should not be limited to health aspects but should include all other priority areas of the Environment Programme.

2. Pest management systems

Introduction

50. Ample evidence exists that at the present time, chemical methods of pest control are not completely satisfactory; some of them induce serious noxious environmental side effects. Concerted efforts are needed to establish non-chemical methods based on concepts of species diversity and system stability. Habitat management and techniques of ecological manipulation (for example, use of predators, parasites, pathogenic organisms, disruption of the vectors' life cycles at their weak points) are means that could be considered in working out such methods.

51. In the course of developing this element of the programme, UNEP should play a catalytic role in ensuring co-operation among countries and agencies interested in the subject. This role will be a limited one involving the convening of meetings for particular purposes, facilitating technical co-operation and helping in the channelling of financial resources to the appropriate users.

#### Objectives

52. The objectives of this element of the Programme are:

- (a) To assess the environmental effects of agricultural chemicals;
- (b) To develop and implement environmentally sound pest management systems for controlling certain pests affecting health and agricultural production.

#### Strategy

53. The strategy for this programme will encompass the following activities:

- (a) A multinational programme will be initiated for research on and application of environmentally sound systems for controlling cotton pests and vectors of malaria and schistosomiasis. The management of other pests could be included as the programme develops. Close contact will be maintained with FAO (for cotton pests) and WHO (for malaria and schistosomiasis) in the formulation and implementation of this programme;
- (b) Activities in this field will be initiated by convening small task forces of experts on each of the three selected pests: insect pests of cotton, vectors of malaria and snail vectors of schistosomiasis. These task forces will identify the existing co-operative activities with respect to each pest, suggest the best way of co-ordinating these on-going activities, and work out proposals for a transnational or world-wide plan of action;
- (c) An international symposium will be convened for all interested Governments and regional and international governmental and non-governmental organizations to consider the implementation of a transnational plan of action which will be proposed for this component of the Programme;
- (d) Co-operative efforts will be promoted in the development of the plan of action in which FAO, the World Bank, UNDP, UNESCO, WHO and such other funding organizations as the Rockefeller, Ford and Clark Foundations and the Canadian and Swedish International Development Associations will play important roles;
- (e) UNEP will collaborate in the design of methodology for research and application of environmentally sound pest management systems;
- (f) Activities to assess the effects of agricultural chemicals will form part of the strategy for environmental criteria outlined in paragraph 42 above.

## C. TERRESTRIAL ECOSYSTEMS, THEIR MANAGEMENT AND CONTROL

### Introduction

54. In accordance with the recommendations of the second session of the Governing Council, the terrestrial ecosystems component of the Programme will be concentrated mainly on arid, semi-arid and grazing lands and on tropical forests and woodlands. Pre-programming activities for other ecosystems (mountains, islands, etc.) will be begun in the near future. Other activities that will receive attention, in accordance with the Governing Council's instructions, relate to national parks and reserves, endangered species and wildlife, soils and genetic resources. In these activities, permanent roles are expected to be played by FAO, UNESCO (MAB) and IUCN.

55. The first objective of activities in this area is to correct the following three main deficiencies in current knowledge about ecosystems and in its application:

(a) Inadequate consideration of the interactions between organisms and chemical and physical environmental factors;

(b) Failure to include man as a component part of all ecosystems, with his social, economic and cultural values determining his behaviour in relation to the other components of the ecosystem;

(c) Inadequate quantitative data on the functioning of ecosystems.

56. The second objective, involving UNEP as well as the other United Nations agencies, is to make available to Governments new assumptions and conceptual frameworks for integrated ecological research, natural resources management and programmes of development.

57. Programmes in pursuit of these objectives should pay special attention to the requirements of the human communities interacting with the other biotic and abiotic components of the ecosystem. The programme on ecosystems will attempt to bring resources and population into balance, taking full account of social and economic factors such as equitable distribution and access to resources and modes of production, consumption and technology.

58. The population of the area concerned must be closely associated with all the stages of the programmes on ecosystems. Socio-cultural variables will play a predominant role both in defining the objectives of such programmes and in formulating measures to meet these objectives.

59. As a first step the activities relating to each type of ecosystem will be concentrated in a few programmes, which have sociological, economic, ecological and physical dimensions and are relevant to regional, inter-governmental and governmental policies. Around the focus of these programmes, researchers, managers and policy-makers should be able to act as co-equal partners, so that a feed-back can be evolved between policy, research and goal formulation.

60. Finally, the ecosystem programmes should provide information that can be used in other UNEP activities aimed at implementation of programmes on eco-development, human settlements, health, conservation, environmental management, etc.

## 1. Arid lands and grazing lands ecosystems

### Introduction

61. The areas under consideration in "arid lands" are those ecosystems stricken by the process of desertification, whether natural or man-induced, leading to loss of productive vegetation cover, disturbances of the hydrological regime and a reduction in the water content of the soil.

### Objectives

62. The objectives of the activities in this sub-area of the Programme will be on a long-term basis:

- (a) To improve water quality and animal production in these ecological systems;
- (b) To arrest and control the processes of desertification, erosion and salinization;
- (c) To restore the productivity of formerly productive areas.

### Strategy

63. The proposed strategy for this programme calls for the following activities, to be carried out on a regional basis:

(a) UNEP will collaborate with WHO, UNIDO and the Working Group on Rural Water Supply and Sanitation in the development of new technologies for water supply and sanitation systems, the improvement of water quality for human consumption and appropriate management of water and waste;

(b) UNEP will contribute to the dissemination of existing knowledge and exchange of new information on arid lands and grazing lands ecosystems to ensure rational use of their resources. Such exchange of information requires:

- Common systems of computerized data bases;
- Standardization of bibliographic format and indexing terminology;
- Accommodation for language differences;

(c) Long-term development programmes will be planned with a view to offering planners and managers alternatives to current practices. To do this, it is essential to know what natural resources are available - particularly soil, water, vegetation - and how they interrelate. It also requires further developments in applying methodologies of systems analysis to studies of natural systems;

(d) The use of appropriate new technologies in food, energy, monitoring, use of waste material, etc., will be promoted in connexion with developing resources and managing the ecosystem. This effort entails education and training for all people concerned, from the farmer to the research workers, to provide a clear understanding of the environmental framework in which man lives;

(e) Participation of the population concerned in the development and implementation of plans will be encouraged to ensure proper consideration of socio-political and socio-economic systems as well as technical and scientific infrastructures;

(f) UNEP will co-operate with appropriate United Nations organizations in the formulation of the state of knowledge on grazing land ecosystems, desertification processes, soil erosion, salination, water quality, etc., in order to identify the gaps and to accelerate the establishment and implementation of a comprehensive programme of international research;

(g) Regional and national institutions working on research into the functioning of these systems and processes will be supported. Special encouragement should be given to the research activities referred to in document UNEP/GC/30 under section III B of the chapter on arid and semi-arid lands;

(h) At the global and regional levels, UNEP will undertake to co-ordinate and stimulate the long-term programmes of the United Nations system in arid and semi-arid lands. Encouragement will be given to efforts to create co-ordinating mechanisms for use of common methodologies in applying integrated knowledge and for training and information exchange.

## 2. Tropical woodlands and forests ecosystems

### Introduction

64. In recent decades the impact of man on the humid tropics has increased greatly, causing considerable damage to the environment which is frequently difficult to reverse. Moreover, the application of inappropriate principles derived from temperate zone ecosystems contributed in large measure to the degradation of the productivity of tropical forests.

### Objectives

65. According to the Governing Council's instructions at its first and second sessions, the objectives of this programme will be:

(a) To identify the extent of world forest cover and to initiate assessment of trends of forestation and deforestation;

(b) To control the loss of productive soil through misuse of the forest cover;

(c) To evaluate the importance of tropical forest plants as a source of genetic material for plant and animal breeding;

(d) To support and encourage concerted research programmes on the effects of tropical forests on the atmosphere and the water regime, soil changes following their conversion to other uses, animal/plant relations, the minimum self-maintaining area, and suitable agricultural systems;

(e) To develop guidelines for management of tropical forest ecosystems with a view to regular and sustained production;

(f) To ensure the best utilization of natural forest ecosystems, applying appropriate technologies to accelerate and improve techniques for planting and regeneration;

(g) To improve the local processing and use of all forest products, including wood.

### Strategy

66. With these general objectives in mind, the following activities are proposed:

(a) Existing information on tropical forest ecosystems and their management will be analysed and disseminated;

(b) The main gaps in present knowledge will be identified so as to concentrate research efforts on crucial topics singled out in document UNEP/GC/30 and to help ensure that new research discoveries are made available to those who are actually dealing with problems of rational use and conservation of natural resources in tropical forests and woodlands;

(c) Mechanisms for monitoring changes in tropical forests will be established, with the active co-operation of FAO and UNESCO/MAB;

(d) Activities will be developed in co-operation with United Nations organizations and non-governmental organizations for monitoring adverse changes in local climate, changes in water cycles and the micro-climate of soils, accelerated soil erosion by wind and run-off and laterization;

(e) Guidelines will be formulated for development, planning and management to help avoid activities that cause major environmental disturbances;

(f) Technical advice will be made available to Governments concerning possible changes arising from transformation of areas occupied by tropical forests;

(g) UNEP will co-operate in the design of a methodology for identifying the minimum area of forest cover that must be conserved to preserve the stability of the biosphere, climate, genetic reservoir, etc. This activity will be co-ordinated with the programmes on conservation of habitats and genetic resources;

### 3. Other ecosystems (general, mountains, islands, etc.)

#### Objectives

67. The objective of the programme in this area will be to initiate activities for improving knowledge of such ecosystems as temperate forests, mountains, islands, lakes and sea shores, with a view to their integrated management. Special attention will be given to arresting the



processes of erosion, soil pollution and eutrophication of inland waters, along with efforts to rationalize activities related to the management of forests.

### Strategy

68. The following strategy is proposed for this area:

(a) An important element of the work envisaged in this field will be co-operation with FAO and the UNESCO/MAB programme on ecosystems not included among the first priorities of UNEP's programme;

(b) Special support will be given to intergovernmental organizations engaged in development or planning activities that affect natural ecosystems. Informal consultations will be held to induce non-governmental organizations to devote part of their activities, under UNEP's co-ordination, to drawing up action plans for studies at the global and regional levels;

(c) Particular emphasis will be placed on inter-regional comparative studies on the origin and structures of ecosystems of the same type;

(d) Investigations will be made as to the possibility of applying knowledge acquired in one ecosystem to the management of other ecosystems of similar type. UNESCO/MAB, together with FAO and scientific organizations, should be major participants in these activities.

### 4. Ecosystems, sites and samples (national parks and reserves)

#### Introduction

69. National parks and equivalent reserves are no luxury. They constitute a very useful form of land use. In addition to their great value from the evolutionary and biological viewpoints, national parks and biological reserves represent valuable economic resources, for they serve as tourist attractions and contribute to the research and training facilities of the country. Over and above the importance of the genetic material they contain and their contribution to the stability of the whole biosphere, they are also useful for comparison with the productivity of areas altered by man.

70. The few natural and cultural areas in the world are threatened by expansive agriculture technologies, human settlements, tourism, industrial developments, etc. It is therefore urgent to create new reserves and to improve those that exist.

#### Objectives

71. In accordance with the recommendations of the Governing Council, the objectives of this programme will be:

(a) To create the basis for a world-wide network of protected areas of terrestrial, marine and inland waters, national parks and biological reserves;

(b) To identify, restore and conserve terrestrial and aquatic ecosystems of great biological and ecological significance as well as natural and cultural areas which constitute the heritage of all mankind;

(c) To identify representative samples of aquatic and terrestrial ecosystems and investigate the impacts of human activities on them. These protected areas would be used as far as possible for research, training and permanent monitoring of natural resources.

### Strategy

72. The classic approach to conservation must be redirected towards a more dynamic conception of the global importance of maintaining samples of aquatic and terrestrial ecosystems. To this end, the following measures are proposed:

(a) Governments will be assisted in evaluating the potential for and advantage of creating, on land and in marine and inland waters, national parks and biological reserves;

(b) Efforts will be made to design international agreements to facilitate the exchange of information and make it possible to identify training requirements and develop plans for meeting them;

(c) Efforts will be made to facilitate co-ordination of the management of protected natural areas shared by several countries. An important element in this co-ordination is to assist, on a regional basis, in the creation of machinery for consultation and co-operation between national parks administrators and to improve co-operative activities between Governments;

(d) Programmes will be launched to establish a world-wide network of parks and reserves, including assistance in strengthening the present legislation protecting national parks. The Convention for the Protection of the World Cultural and Natural Heritage could act as a basis for the preparation of more specific actions, supplemented by other regional agreements such as the African Convention on Conservation of Nature and Natural Resources signed by the African Heads of State in 1968. UNEP, in co-operation with international non-governmental organizations such as IUCN and the World Wildlife Fund, and with Governments and United Nations organizations (especially UNESCO/MAB project 8 and the FAO Regional Parties on National Parks and Wildlife Management) will co-operate with Governments in identifying new natural and cultural areas that offer representative samples of ecosystems;

(e) A comprehensive training programme will be elaborated for managers of national parks, biological reserves and wildlife, paying special attention to the priorities for action and to the long-term requirements. Programmes will also be launched to improve the population's understanding of the problems of conservation.

## 5. Endangered species and wildlife

### Introduction

73. All plant and animal species, including micro-organisms, are important for the stability and functioning of terrestrial or aquatic ecosystems and of biomes and habitats, for they preserve food-chains and mechanisms for litter breakdown and soil formation. In most cases, endangered species constitute unique components of the ecosystems, and their habitats should be protected.

74. Management measures are often conceived too late to save a threatened species because the possible use of such wildlife has scarcely been explored and, in the case of many species, it is not fully known whether they are threatened or not. In these cases, the populations may decline beyond minimum size, and the species cease to be a significant, functioning element of their ecosystem.

### Objectives

75. The objectives of this programme will be:

(a) To maintain the health of particular ecosystems, biomes or habitats, by preserving the minimum population size necessary for the survival of a given species;

(b) To help ensure that conservation and management measures for endangered species, and the legislation on which such measures are based, take full account of (a) above;

(c) To support research activities designed to give adequate basis for the right strategy to achieve these objectives.

### Strategy

76. The following programme is envisaged <sup>3/</sup>:

(a) Research will be done on the environmental role of each species of wild plants and animals as a functional part of ecosystems, biomes and habitats;

(b) Advice, encouragement and support will be given to governmental initiatives to pass legislation for the conservation and management of endangered species and their habitats and, more broadly, for the utilization of and trade in wildlife and its products;

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<sup>3/</sup> A close relationship exists between this activity and the programme on national parks and equivalent reserves, for the disturbance or elimination of a given ecosystem by human activity often threatens the existence of wildlife.

(c) Governments will be encouraged to consider the long-term advantages of wildlife resources as productive parts of their modalities of land and resources utilization and the benefits from introduction of domestic animals, plantations or monocultures;

(d) Governments will be encouraged to assess the interactions between water, soil, vegetation and populations of wild animals as renewable natural resources;

(e) Wild animals will be monitored at regional as well as global levels with a view to learning their population dynamics, migration, adaptive behaviour and physiological responses to seasonal changes in various geographical areas;

(f) The impact of pollutants on wildlife in the terrestrial and aquatic environment will be identified by progressive establishment of a permanent monitoring system;

(g) The list of threatened plant and animal species will be updated, with particular emphasis on species of high scientific importance or potential economic value;

(h) Criteria, new methodologies and approaches will be developed for identifying rare endangered and non-endangered species, and ascertaining the main causes of extinction;

(i) Action will be taken pursuant to the Convention on International Trade in Endangered Species of Fauna and Flora to reach agreement prohibiting extreme exploitation of wildlife resources.

## 6. Soils

### Objectives

77. The objective of the programme on soils is to investigate soil degradation processes and to help prevent soil degradation and restore or improve soils which have been damaged or degraded.

### Strategy

78. The major preoccupation being with soil loss, in its quantitative as well as its qualitative aspects, the programme proposed for this area is as follows 4/:

(a) Efforts to obtain a quantitative measure of available soil and a qualitative measure of its productivity. In this connexion, UNEP will collaborate in the production of the World Map of Soil Degradation, which is already proceeding under the direction of FAO, and in studies and pilot projects on the dynamics of degradation;

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4/ UNEP's activities in this area will form a component of the integrated programmes for the priority subject areas - i.e., arid and semi-arid lands, woodlands, tropical forests and grasslands.

(b) Studies to understand the dynamics of soil loss - for example, salination, movement of sand and sand dunes, laterization, soil erosion and soil leaching;

(c) Programmes at the regional and local levels to restore fertility to soils, taking advantage of new chemical fertilizers, biological sources of fertilizers such as micro-organisms (especially nitrogen fixators) and other local sources such as compost, green manure, domestic wastes;

(d) Action to prevent further soil loss, especially where the process is rapid. Projects on re-vegetation of degraded ecosystems will be emphasized, especially afforestation of marginal lands (e.g., around the Mediterranean) and stabilization of sand dunes in arid lands.

79. A special effort will be made to develop integrated mechanisms for the implementation of this strategy.

## 7. Water

### Introduction

80. In the field of water, the current concern and activities of UNEP, as stipulated by the Governing Council, are limited to the area of water quality, within which it is to ensure, through an integrated environmental programme, the improvement of water quality and maintenance of suitable quality levels. In the field of water resources, it is to participate actively in the co-ordination of existing programmes within the United Nations system to meet present and future requirements.

81. The present programme document follows closely the decision of the Governing Council. In order to construct a balanced and more realistic framework, the water programme should relate not only to the impact of human activities on water resources and quality, but also to the impact of water resources on the environment. This approach would make an integrated approach to water resource management for environmental protection approach easier to co-ordinate.

### Objectives

82. The objective of this area of the programme will be to develop a concerted effort directed towards:

- Arresting and correcting existing unsatisfactory water conditions;
- Preventing and protecting water sources against further degradation through the practice of more effective forms of water use.

These phases of the process will be integrated and complementary.

83. The implementation of the above objective during the next two years should provide an appreciable input to the United Nations Water Conference at Buenos Aires in 1977. UNEP should support the preparatory regional meetings for this Conference and assist in focusing its objectives and in meeting them.

### Strategy

84. UNEP proposes to encourage activities in co-operation with the appropriate United Nations agencies directed towards the improvement of water quality through pilot projects, international seminars and workshops as well as suitably co-ordinated activities designed to apply relevant knowledge. Accordingly, the strategy envisages the following activities:

- (a) The principle of recycling waste-water and sludge will be promoted, especially in zones where water is scarce;
- (b) Information on sound waste-water handling methods and technology will be propagated for use by Governments;
- (c) The modification of industrial and agricultural processes will be urged in order to render wastes harmless and safeguard waterways from contamination;
- (d) Support will be given to programmes for the protection and conservation of water sources of specified quality, as well as non-polluted rivers, lakes, estuaries, and glaciers and ecosystems sustained by them;
- (e) Information on existing appropriate low-cost technology will be made available to Governments to enable them to make the best use of funds for the supply of drinking water, treatment and disposal of waste and use of water in agriculture. Research in this respect will be encouraged;
- (f) UNEP will assist in decisions on the choice between alternative uses of available water to help ensure that it is used judiciously;
- (g) To utilize water of varying quality, modifications in water resource management will be encouraged to effect consecutive multiple use of water;
- (h) Integrated programmes of water use and land management will be developed to find ways of improving land that has deteriorated and become unsuitable for agriculture as a result of water-logging and excessive salinity and erosion;
- (i) Multidisciplinary efforts will be promoted to ensure that elements of environmental safety are appropriately included in plans for river basin development and taken into account during construction so as to minimize damage to the environment. A first approach would be to initiate studies to establish methodologies for the preparation of river basin atlases and to support pilot projects to test them;
- (j) Because of the role of water in various activities, the proposed water programme will maintain close links with relevant subject areas of the environment programme, i.e.
  - The proposals for action by GEMS to establish a pilot framework for a world-wide evaluation of contaminated rivers;

- The human settlements programme insofar as it concerns methods of water supply, liquid waste disposal and sewage treatment;
- The environmental health programme insofar as it concerns non-chemical control of water-borne diseases;
- The arid and grazing lands programme insofar as it concerns water quality considerations;
- The oceans programme, with respect to polluted land-based sources of water;
- The conservation of nature and wildlife programmes insofar as they concern preservation of aquatic ecosystems and wetlands;
- The energy programme, with respect to consequences of hydro-electric schemes and disposal of cooling water thermal and nuclear plants.

## 8. Genetic resources

### Introduction

85. Erosion of the genetic resources of the biosphere is an inevitable part of economic and social development exemplified by a wide variety of human activities. The loss of a species, or even a loss of genetic diversity within a species, is the loss for ever of an opportunity to improve human welfare. Action to conserve and salvage the natural biosphere ensures a continuing genetic diversity which is the only guarantee of the survival of man himself. Work in this area has to be closely correlated with work on endangered species and wildlife.

### Objectives

86. In view of the urgent need to conserve diverse species of plants and animals, the Governing Council has set the following as objectives for this area:

- (a) To search for knowledge about threatened species, and to evolve a strategy to conserve plants and animals and preserve germplasms;
- (b) To undertake studies on micro-organisms which could enable man to use them in efficient and novel ways for his betterment and for the enhancement of the environment.

### Strategy

87. The obvious primary concern is for species - both domesticated and wild - of known or potential value in agriculture, forestry or fisheries, or of other clear economic or aesthetic value. Unfortunately, it is impossible to predict in precise terms which species carry as yet unrecognized benefits and therefore which ones should be targeted for protection. The only sensible policy must therefore be to preserve examples of as many as practicable.

88. The preferred strategy is therefore to move through all the groups of organisms - plants, animals, micro-organisms and insects, - assess the state of the key species therein and take the appropriate action. When the state of knowledge is inadequate for a comprehensive programme, efforts will be made to conserve the habitats of as many species as possible, in as many geographical areas as possible, in the hope that unknown species, with their unknown potential value, may be retained along with those that are more fully understood.

89. The principal activities in this connexion will be: surveys, inventories, exploration and collecting, documentation, evaluation and utilization, and conservation. Each resource will dictate the crucial action required.

90. To help ensure effective implementation of the strategy, two additional activities are envisaged:

- (a) Specialist training programmes to ensure the existence of local expertise to facilitate programme activities;
- (b) Specialist research programmes aimed directly at creating knowledge to fill the gaps and thus lead to specific actions. Special emphasis should be given to research programmes on fodder plants of the arid and semi-arid zones, to increase man's ability to exist in those ecosystems.

91. Finally, the strategy should include activities designed to create newer and unorthodox uses for genetic resources, thus contributing to an overall and wiser form of resources utilization and conservation.

92. The strategy formulated above clearly calls for several levels of support:

- From Governments, whose own national activities would ensure the global coverage;
- From FAO, whose co-operation is necessary for activities concerned with organisms of importance to agriculture and agricultural industries;
- From UNESCO, whose co-operation is needed for the other forms of conservation, especially through its programmes on micro-organisms and MAB Project 8;
- From other intergovernmental organizations such as the World Bank - with deep interests in gene pool conservation;
- From multinational non-governmental organizations which have supported work in this area in the past.



## D. ENVIRONMENT AND DEVELOPMENT

### 1. General considerations

93. The 1970s have brought about some notable changes in international relations. There has been growing acceptance of the fact that the major issues facing mankind, their causes and their solutions, are interacting and interdependent and form part of a complex network of relationships. The recognition of these relationships means that attempts to deal with any particular issue within a given area have inevitably to involve other areas. This new international awareness is related to the emergence of the environmental problems, and is reflected in the way the question of the environment itself has evolved. In the early days, the environment was often looked upon as a pollution problem only, to be tackled through technological and administrative solutions. Today, however, the environment is being recognized as an all-encompassing concept. It was the Stockholm Conference which brought out explicitly the organic relationships and complementarity between the quality of man's physical environment, the growth of population, the patterns and nature of resource and space use, and such factors as societal goals and value systems, socio-economic structures and institutions, production systems, life and consumption styles, and national and international patterns of trade, wealth and income distribution.

94. Another important factor has been the change in the concept of development which has been taking place in the last few years. Development has, for a long time, been considered essentially as a unilinear path in the footsteps of the developed countries, with a few aggregate indicators such as per capita GNP representing the principal yardstick for judging progress. Today, greater emphasis is given to quality of development and to social goals. The needs of the lower strata of the population have emerged as one of the basic aims of the development process. Prominence is being given to alternative development patterns and to the self-reliance of developing countries. And the environmental dimension has come to the fore. While these elements are now new, placed together they represent an important shift in international thinking and are likely to have far-reaching consequences for international and national development strategies.

95. It is the interdependence of issues facing the international community and the evolving concept of development, together with such basic normative goals as protecting and improving the environment for present and future generations, and arriving at an equitable and just economic order, nationally and internationally, which would secure decent and healthy living conditions for all inhabitants of the earth, that provide the framework for UNEP's objectives and approach to environment-development issues. In a single phrase, this quest can be described as one of "trying to meet the basic human needs without endangering the outer limits of the biosphere's carrying

capacity". 5/ This implies moving towards a highly interdependent type of global community of nations. It means adopting a comprehensive approach to and a long-term perspective of patterns of resource use (including global commons), and benefits derived therefrom, of the state of environment, of the international division of labour and trade, of the utilization of space, of population growth and distribution, of technological styles and production systems, of consumption patterns and life styles. To reflect these interacting relationships in institutions and in the approaches to problems will not be an easy task and will require time. The 1975 Special Session of the General Assembly can take an important step in this direction by agreeing on a comprehensive and integrated concept of development and by initiating changes in the United Nations system to reflect new realities and to meet new requirements. 6/.

### Objectives

96. The basic normative goal adopted at Stockholm, i.e. "to protect and improve the environment for present and future generations", together with the aim of creating an equitable international economic system to support this goal, provide the all-encompassing vision within which UNEP's programme regarding environment and development is to evolve. Its broad objectives are as follows:

- (a) To promote the internal efforts of countries to develop their capacity for autonomous goal-setting and decision making;
- (b) To play the role of innovator, initiator and catalyst in the search for alternative patterns and approaches to development and for a new rationality based on a new set of goals, by constantly testing new concepts, organizing feedback, and thus contributing to the broadening and dispersion of the theoretical knowledge available;
- (c) To help orient the environmental policies of the international community and of individual countries so as not to create obstacles to development, and to help orient economic policies of the international community and of individual countries so as to further environmental objectives;
- (d) To help define the link between technology, the environment and development in order to determine the role of technology in the development process and in man's action to transform the environment.

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5/ See the Declaration of the Symposium on Patterns of Resource Use, Development and Environment Strategies, jointly organized by UNEP and UNCTAD, held in Cocoyoc, Mexico, 8-12 October 1974 (A/C.2/292). See Level 3 document (UNEP/GC/32), sections on environment and development, and on outer limits, for description of related projects and of the follow-up action to the Cocoyoc Symposium.

6/ See "Determination of Environmental Elements for Inclusion in the Criteria for Review and Appraisal of the International Development Strategy for the Second United Nations Development Decade". (Document UNEP/GC/33).

### Strategy

97. The above objectives are not simple, nor are they short-term. The limited capacity of UNEP, and indeed of all international organizations, makes these objectives even more difficult to attain. Nonetheless, they provide an overall framework within which can be fitted actions ranging from small pilot projects and recommendations and assistance to Governments, to broad initiatives in international organizations and advanced theoretical research. As a first step, the following strategy is proposed:

(a) A global approach will be taken to the solution of environmental problems, consisting of a planned restructuring of international economic relations and development of new patterns of resource use, space use, development and use of technology, and long-term population policies. While most of these issues are primarily within the responsibility of organizations other than UNEP, UNEP must concern itself with them because the environment permeates all and has a synthesizing effect.

(b) UNEP will participate actively in the construction of the new economic order approved by the sixth special session of the General Assembly.

98. A separate section of this document is dedicated to environmental management, in view of its great importance. However, it is clearly impossible to examine environmental management outside of the general context of environment and development. Consequently, even though they are presented separately, problems of integrated planning and environmental management will be handled in the general framework of environment and development.

## 2. Eco-development

### Objectives

99. The objectives of the programme in this area are:

(a) To further refine the present operational concept of eco-development;

(b) To develop a set of guidelines for development planning consistent with the eco-development approach;

(c) To include the concept of eco-development in the integrated planning of development.

### Strategy

100. Development at regional and local levels should be consistent with the potentials of the area involved, with attention given to the adequate and rational use of the natural resources, and to application of technological styles (innovation and assimilation) and organizational forms that respect the natural eco-systems and local socio-cultural patterns.

101. The principal element in the proposed strategy will therefore be to involve professionals in various disciplines, so as to fuse their different views into a clear concept of eco-development. Development of this concept will require new criteria of analysis and evaluation as well as definitive methodologies. The concept should be enriched and expanded continuously through screen and analysis of projects and experiments.

3. Socio-economic impact of environmental measures  
or their absence

Objective

102. The objective in this area is to obtain adequate knowledge of the real effects of the presence or absence of various environmental policies and/or measures.

Strategy

103. The environment is continuously affected by economic growth and social change; consequently, measures taken to correct environmental disruptions form a continuous and very complex process. Several limitations, including problems of perception, adaptation, reversion and social and individual values, arise in trying to measure environmental disruption and/or environmental improvement. Attempts to assess costs and benefits in monetary terms or by the use of other quantitative systems can lead to distortions, for if elements are not commensurable, or "prices" are non-existent, the values introduced are likely to be arbitrary, and conventional cost-benefit analysis may be insufficient for the adequate evaluation of environmental impact in general, and the impact of environmental measures in particular.

104. The main elements in the proposed strategy will be the following:

- (a) To individualize, classify and group "types" of social and economic consequences of environmental measures or of their absence;
- (b) To develop new methodologies, other than the classical methodologies of cost-benefit analysis, for evaluating the impact of environmental measures or of their absence;
- (c) To evaluate trade-offs, i.e. the monetary and non-monetary costs of environmental measures versus the costs of their absence;
- (d) To examine how costs of environmental measures are internalized and transferred.

4. Natural products, including food  
(New and alternative products; rational uses of natural  
resources; substitution; natural versus synthetic products)

Objectives

105. The objectives in this area are:

(a) To define new criteria and patterns for natural resources use consonant with the new goals and requirements and corresponding to alternative patterns of development;

(b) To evaluate the environmental consequences of the replacement of natural by synthetic products and vice versa, of new uses of natural products and of new products (natural or synthetic);

(c) To introduce patterns for replacing non-renewable natural resources with renewable natural resources;

(d) To identify new uses for abundant and/or renewable natural resources.

### Strategy

106. The concept of resource is a dynamic one, varying with the scientific knowledge and technology available and with societal goals. Certain uses of natural resources have an adverse effect on the environment, and it is therefore necessary to explore the replacement of certain materials by others to permit better management of resources.

107. The problem of substitution, however, cannot be examined only from this narrow angle: patterns of use of natural resources, and resource management criteria, must be considered in the broader context of new patterns of development.

108. In view of the need for an integrated approach to decisions on substitution, the main elements of the proposed strategy are:

(a) To examine the nature of the process of substitution of certain resources by other resources;

(b) To include environmental considerations in the process of development of new products, and in the programmes for developing synthetic and natural product industries;

(c) To investigate the possibilities of replacing existing products by new products with more positive overall environmental impact;

(d) To develop guidelines for the rational use of natural products on the basis of the new objectives of the international community as defined in recent years, e.g. low-energy versus high-energy raw materials, renewable versus non-renewable resources and nonconsumable versus consumable materials.

### 5. Technology (low-waste and non-waste technologies, recycling and transfer of technology)

#### Objectives

109. The programme objectives in this area are:

(a) To develop and promote environmentally sound technologies and techniques for using them, and to contribute to devising research and development policies designed to achieve this objective;

(b) To evaluate the guidelines, reasoning and interests that have governed the process of research and development and to consider in the evaluation the effects of the use of the resulting technologies on the environment;

(c) To examine the problem of technological dependence and the need for adaptation to the environment in the overall process of transfer of technology;

(d) To define the role that environmental factors have played and should play in the selection and transfer of technology;

(e) To promote transfer of technologies in accordance with the requirements and the specific characteristics of recipient countries and to help developing countries adapt these technologies;

(f) To contribute to developing new international rules and practices for the transfer of environmentally sound technologies;

(g) To identify specific areas in which the developing countries can make an effort to create their own technologies oriented towards rational exploitation of natural resources with due consideration of environmental factors;

(h) To contribute to defining the concept of social responsibility in research and development.

#### Strategy

110. An important consideration in evaluating technology patterns is that technical knowledge tends to remain concentrated in the places of its origin, which can lead to monopolization of technological creation and control. The modes of creation and control thus tend to reflect the dynamics of those countries or areas in which the concentration takes place. Furthermore, market criteria have not helped foster the development of technologies appropriate to all local conditions or useful in all parts of the world. Thus, any effort to transfer technology and encourage its assimilation and adaptation must be especially cognizant of development patterns and technological means which are acceptable and suitable to the recipient countries as well as of the environmental factors.

111. Among the principal components of the strategy are:

(a) The promotion of research activities on technical and economic aspects of low polluting and non-waste technology;

(b) The definition and identification of new patterns of research and development and the transfer of technology;

(c) The identification of environmental factors in the process of research and development and transfer of technology;

(d) Advice to Governments, investors, industrial enterprises and trade unions on the selection of technologies for new investment projects;

(e) The strengthening of research and development capacity in developing countries in accordance with their specific needs and characteristics;

(f) Continuing consultations with Governments, international organizations and the international legal community to facilitate the development of international rules and practices for the transfer of technology.

#### 6. Environmental problems of specific industries

##### Objectives

112. Certain major industries (including pulp and paper, petroleum, automobiles, chemicals, iron and steel) as well as agriculture, have major impacts on the environment. These effects must be understood, and guidelines and principles developed for their rational management as part of the effort to protect and enhance the environment and to find harmonious new patterns of development:

(a) To formulate guidelines for the use of Governments in assessing and controlling the broad environmental effects of certain industries;

(b) To develop information on the environmental effects of industries which may be of use in other parts of the Programme.

##### Strategy

113. The major element in the strategy will be to enlist the co-operation of industry, on an industry-by-industry basis, in identifying major environmental concerns of particular industries and formulating measures to deal with them. The views of employees and trade unions, as well as those of State-owned and private industries, will be considered through industry workshops and associated technical meeting groups which will define and analyse the relevant problems. Consultations with Governments will continue at all stages of this exercise. Due account will be taken of the related work already carried out elsewhere.

#### 7. Industrial location

##### Objectives

114. The programme objectives in this area are:

(a) To define new criteria for industrial location in which environmental parameters are taken into account;

(b) To introduce spatial distribution of industry as a new element in the international division of labour, and to link this with the new international economic order;

(c) To enable developing countries to benefit from relocation of industry in continuing their policies of industrialization while taking into account environmental protection.

### Strategy

115. The strategy aims at developing better criteria for industrial location in which environmental parameters are taken into account. In developing these criteria, the evaluation of following factors is envisaged:

- (a) The requirements of international trade and of certain types of industry;
- (b) The effect on population distribution and human settlements;
- (c) The problem of availability of space;
- (d) Environmental impact of particular industrial processes.

### E. OCEANS

#### Introduction

116. At its second session, the Governing Council made the following observations for the guidance of the Executive Director in selecting the activities on which the programme will concentrate in the area of oceans:

- (a) UNEP should concentrate on the co-ordination of the activities of other agencies concerned with the oceans, and on the protection of the marine environment;
- (b) It should encourage and support regional agreements on the protection of specific bodies of water from pollution. High priority should be given to the Mediterranean, but the importance of activities in other specific bodies of water was also stressed;
- (c) It should follow up the progress in the development of the law of the sea with a view to ensuring that environmental considerations are safeguarded.

#### Objectives

117. In accordance with these decisions, the objectives of the programmes in relation to oceans will be to work out and support the implementation of plans for arresting pollution of the oceans and closed or semi-closed seas, and for managing the aquatic living resources to ensure that the best use is made of them. Efforts will also be made to ensure that environmental considerations are taken into account at the Law of the Sea Conference.

### Strategy

118. The programme of work envisaged is as follows:

- (a) Promotion of international and regional conventions, guidelines and action for the control of marine pollution and for the protection and management of aquatic living resources;
- (b) Assessment of the state of pollution and of living resources;



- (c) Monitoring of marine pollution and aquatic living resources;
  - (d) Exchange of information on marine pollution and aquatic resources.
- Research, exchange of information and training will be common features of all parts of this programme.

#### 1. Regional activities

119. As directed by the Governing Council, priority is given to regional activities for the protection of specific bodies of water from pollution. To consolidate activities in this area and harmonize the action to be taken in each area, the Executive Director intends to develop with the aid of consultants and in close co-operation with the countries concerned and the appropriate agencies, model plans of action for the protection of specific bodies of water. These plans will be adapted to the special conditions of each region. Such model plans of action would include:

- (a) Integrated planning for development which would take account of environmental considerations and the development and management of marine resources including coastal areas;
- (b) Research, monitoring and exchange of information programmes (this would take the form of regional GEMS and activities of the IRS);
- (c) Regional conventions, protocols and technical annexes.

120. The first effort in this direction has already been started for the Mediterranean area, and will be followed by action in other regions, which will include work for the development of coastal areas in specific regions.

#### The Mediterranean

121. In consultation with the Governments and agencies concerned, and at the invitation of the Government of Spain, the Executive Director called an intergovernmental meeting on the Protection of the Mediterranean to which all the coastal countries of the Mediterranean were invited. The meeting was held at Barcelona from 28 January to 4 February 1975. Its report will be made available at the third session of the Governing Council.

122. The purpose of this meeting was to develop a plan of action including the aforementioned components and drawing heavily on work already done by other United Nations agencies, notably FAO. At the time of writing this document, drafts for such plans for the consideration of the meeting had been prepared by a number of consultants under the supervision of a Task Force consisting of experts selected from Governments and agencies.

123. The development part of the draft plan highlights the need to identify styles of development that would make use of the wealth of the Mediterranean as an eco-region without causing damage to the environment. To this end, the plan envisages encouragement of work and exchange of information on projects and technologies to:

- (a) Reduce levels of contamination from municipal sewerage discharges into the Mediterranean;

(b) Assess environmental impacts of various development programmes such as new industrial or urban developments, extension or creation of tourism areas, and off-shore leasing.

124. In addition, development plans could include programmes for:

- (a) Marine culture;
- (b) Use of salt lagoons, parks and deep-water and coastal reserves;
- (c) Use of solar energy;
- (d) Abatement of agricultural pollution resulting from fertilizers and pesticides in water run-off;
- (e) Promotion of tourism;
- (f) Use of treated sewage;
- (g) Recycling of waste water.

125. Consideration should also be given to the concept of eco-development as one alternative style of development.

126. UNEP's arid lands programme activities in the Mediterranean area will be linked to the activities of the Mediterranean Programme.

127. As for living resources, the main elements would be the assessment of effects of pollution on living organisms and survey called for by the General Assembly on the state of marine resources.

128. The draft plan also includes monitoring and research programmes on:

- (a) Oil and petroleum hydro-carbons in main waters; metals, particularly mercury, in marine organisms; and DDT, PCBs and other chlorinated hydro-carbons in marine organisms;
- (b) Effects of pollutants on marine organisms and their populations, marine communities and ecosystems;
- (c) Coastal transport of pollution;
- (d) Coastal water quality control.

129. Finally, the proposed plan calls for the development of a framework convention of the basis of the guidelines developed under the auspices of the FAO as well as a number of protocols and annexes dealing with subjects such as:

- (a) Co-operation in pollution emergencies;
- (b) Dumping from ships and aircraft;
- (c) Land-based pollution;
- (d) Pollution related to sea-bed exploration and exploitation and pollution from ships.

130. It is envisaged that a plenipotentiary conference will be convened late in 1975, again at Barcelona, to sign a framework convention and whatever protocols may be finalized at that time. A good deal of work in co-operation with legal experts nominated by Governments will be required between the first and second meetings.

131. Implementation of the action plan approved by Governments will be the responsibility of an interagency group comprising representatives of the ICSPRO agencies (FAO, WMO, IOC and UNEP). Implementation would involve development by groups of experts of detailed work plans to be undertaken by individual Governments or institutions.

132. The action taken for the Mediterranean may serve as a useful model for actions in other regional areas.

#### The Red Sea

133. On the initiative of ALECSO, the coastal countries of the Red Sea held an expert meeting at Jedda from 25 November to 2 December 1974 to develop a programme for the protection of the Red Sea. UNEP was invited to participate in the meeting and took an active part in its work.

134. Now a plan of work has been agreed comprising actions to be taken at national and regional levels. UNEP intends to co-operate with the coastal countries through ALECSO in the implementation of this plan.

#### The Persian Gulf

135. For some time, planning has been going on for a conference of the Gulf coastal countries to consider the protection of the Gulf against pollution. It is hoped that the conference will be held early in 1975.

#### Other areas

136. A monitoring programme is being developed for the Indian Ocean in co-operation with the Indian Oceanographic Institute. This programme could lead to a regional component of GEMS.

137. Activities will also be undertaken to develop similar programmes for the Caribbean and other areas.

### 2. Global monitoring and assessment of marine pollution

138. On the global level, monitoring of marine pollution will be carried out under the GEMS programmes. The most important activity in this area will be the implementation of the Integrated Global Ocean Station System (IGOSS) pilot project, sponsored by IOC and WMO, for monitoring oil pollution. At the same time, efforts will continue to develop widely accepted monitoring and sampling techniques, not only for oil pollution but for other priority pollutants which were agreed by the Intergovernmental Meeting on Monitoring.

139. As for the assessment of marine pollution, the principal ongoing activity at the international level is the development of a plan for the Global Investigation of Pollution in the Marine Environment (GIPME). The latest development in this respect is the definition by the International Co-ordination Group of the main components of this programme, which are as follows:

(a) Baseline studies to determine the present distribution of pollutants in the marine environment;

(b) Mass balance studies to incorporate data on major pollutant sources, transfers and fates of pollutants in the marine environment;

(c) Studies of transfer processes for pollutants in the marine environment;

(d) Development of basic standards for exposure of either man or marine organisms to provide the basis for efforts to control marine pollution.

140. This programme is supported by a number of inter-agency and other scientific groups such as the Group of Experts in Scientific Aspects of Marine Pollution (GESAMP) and the Scientific Committee on Oceanic Research (SCOR) of the International Council of Scientific Unions (ICSU). UNEP should concentrate on accelerating the development of the plan and the implementation by governmental and non-governmental institutions.

### 3. Monitoring and assessment of the state of aquatic living resources and their management

141. The most active organization in this area is FAO which, through its international and regional fisheries councils, has programmes at both international and regional levels aimed at protecting living aquatic resources and fisheries against the harmful effects of marine pollution. These programmes include:

(a) Studies on the effects of pollutants on aquatic living resources;

(b) Development of methodologies for monitoring;

(c) Surveys of the state of living resources, including the survey of living marine resources threatened with depletion requested in General Assembly resolution 3133 (XXVIII), the conduct of which was entrusted to FAO by the Governing Council. FAO carries out annual reviews of the status of exploitation of the world fish resources as part of the programme of its Department of Fisheries. These reviews are submitted on a regular basis to the FAO Committee on Fisheries, itself an intergovernmental body, for discussion and recommendation concerning international management problems raised.

142. The most recent review, compiled in June 1974, covers all the living resources under intensive exploitation as well as many resources that are lightly exploited or unused, and thus meets the requirements of the study requested by the resolution. The review was made available to the Third United Nations Conference on the Law of the Sea at its Caracas session and was submitted for discussion by the FAO Committee on Fisheries in October 1974. Copies of the review are available for consultation by delegates. The next review, incorporating more recent data and analysis, will be prepared during the first half of 1975.

#### 4. International agreements

143. UNEP has already participated in the development of the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters and the International Convention for Prevention of Pollution from Ships (1973) as well as in the preparation of a protocol relating to Intervention on the High Seas in cases of Marine Pollution by Substances other than Oil.

144. Further efforts will be aimed at:

(a) Participation in efforts to develop international agreements for the protection of the marine environment and its living resources against the harmful effects of pollution;

(b) Assistance where necessary to bring into force international agreements already concluded.

145. It has been proposed that UNEP should be assigned responsibility for sponsoring agreements on the control of land-based sources of pollution, the other sources being primarily the responsibility of other organizations.

146. During the 1974 session at Caracas of the United Nations Conference on the Law of the Sea, the Executive Director, following the directives of the Governing Council, stressed the importance of adequately reflecting environmental interests in the new rule of law for the oceans, and presented sixteen specific points concerning the protection of the marine environment which he believed should be incorporated in the new law of the sea treaty.

147. UNEP was specifically requested by the Conference to prepare a report for Committee 3 at the next session of the Conference describing both the international programmes and the national components of its monitoring system, including financial implications.

#### 5. Exchange of information

148. This programme will include the development, within the framework of IRS, a system for the exchange of data and knowledge on marine pollution and aquatic living resources.

149. In addition, in view of the proliferation of activities undertaken by a multitude of organizations, there is a clear need to undertake a survey of those activities, so as to ensure co-ordination and to avoid overlapping. This survey will be the basis for selecting co-operating and supporting agencies, and will be conducted in co-operation with ICSPRO.

#### F. ENERGY

150. A report containing the Executive Director's recommendations for a possible further programme on energy will appear as document UNEP/GC/31/Add.1, "Review of the impact of energy production and use on the environment and role of the United Nations Environment Programme".

## G. NATURAL DISASTERS

### Introduction

151. Natural disasters are viewed as covering natural events resulting in widespread damage to large areas, the effects of which cannot be coped with by the affected community alone. Natural disasters of slow onset, such as drought and desertification, or those directly affecting health, such as epidemics, are dealt with under other priority areas and are not included in this programme. The expression "disaster prevention" as used in this programme covers measures aimed at preventing natural phenomena from resulting in natural disasters, not at preventing the phenomena themselves.

152. The Governing Council decided during its second session to include the topic of early warning and preparedness planning for natural disasters among the priority areas for action by UNEP. The Council further requested the Executive Director to prepare, in co-operation with the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), UNESCO and WMO an action programme for consideration by the Governing Council at its third session. In response to this request, the objective of the programme proposed for this area will be to seek improvement of warning techniques and prevention and mitigation action.

#### 1. Survey and analysis of existing knowledge

153. Because of the wide array of activities undertaken in this field by numerous institutions, scattered all over the world, and the lack of certain types of data, the attempt to formulate a specific long-term UNEP work programme on natural disasters will begin with an assessment of the economic and environmental impact of disasters and of existing knowledge in the field of disaster prevention and mitigation.

#### (a) Economic and environmental impact of disasters

##### Objectives

154. Accurate data on the true impact of disasters are at best fragmentary, even in developed countries. However, such data are prerequisites for policy decisions regarding priorities for further action. In view of the limited availability of resources, it is necessary, for instance, to establish orders of priority with respect to types of disasters or geographical regions to be covered first. Statistical data on actual disaster damage can make it possible to carry out cost-benefit analyses of the various possible preventive measures and thus to reach more rational decisions as to the use of specific techniques and available resources.

##### Strategy

155. As a first step, a World Survey of Disaster Damage is contemplated, starting in 1974, for which UNDRO will be the co-operating agency.

Other parts of the United Nations system will also participate, particularly the Resources and Transport Division of the Department of Economic and Social Affairs, which considers the data to be collected on flood damage a substantial input for the United Nations Water Conference to be held in 1977. The survey may be followed at a later stage by studies on specific aspects of the environmental and social impacts of disasters.

(b) Disaster prevention, mitigation and warning techniques

Objectives

156. The objective pursued here is to identify:

(a) Existing knowledge which can be directly applied in developing countries;

(b) Gaps requiring urgent action on the part of the international community.

Strategy

157. Two projects in pursuit of this objective are currently under way. "Study of the state of the art in disaster prevention and mitigation" - which is to cover seismological, volcanological, hydrological and engineering aspects as well as health, land-use, community preparedness, public information, sociological and legal aspects - is to be completed by the end of 1976. It aims at bringing together in one single document detailed information on the best means devised so far to prevent or mitigate the harmful effects of potentially disastrous natural phenomena. "Implications of natural disasters on the planning, construction and management of human settlements" project due for completion in the autumn of 1975, aims at placing at the disposal of the authorities of developing countries, manuals which will enumerate steps required to be taken at the three stages of development of human settlements to reduce to a minimum their vulnerability to disasters. Both these projects are being implemented by UNDR0 with the participation of the various United Nations agencies and bodies concerned, particularly UNESCO, WMO, WHO, FAO and - in the United Nations Secretariat - the Centre for Housing, Building and Planning and the Resources and Transport Division.

2. Possibilities for the immediate practical application of existing knowledge

158. Existing knowledge that can be directly applied in developing countries is being identified, but methodologies for the application of such knowledge and the transfer of technology involved must still be developed. As a first step in this direction, WMO initiated in 1974 a four-year project on the "Quantitative evaluation of tropical cyclone disaster risks".

- The first phase of the project, of one year's duration, will consist of the development of the required methodology;
- The second phase (two years) will be a pilot project to test and improve the methodology;

- The last phase (one year) will focus on expanding the applications of the techniques thus developed to as many interested countries as possible;

159. Similar projects focusing on other types of disasters or other aspects may be contemplated in the future as resources become available.

### 3. Development and dissemination of new knowledge and improved techniques

160. A further step within the framework of a UNEP work programme on natural disasters, as distinct from the problems involved in the transfer of existing technology, is the development and dissemination of new or improved technology. The effort required may vary according to the particular field considered. In general terms, it may include the following:

- (a) Research on natural phenomena to permit more precise location of hazard zones and assessment of risk within these zones;
- (b) Research into the possibilities of action on natural systems to reduce the probability of occurrence - or the intensity - of disastrous phenomena;
- (c) Development of improved techniques for reducing the extent of damage to buildings and public works from extreme natural phenomena;
- (d) Improvement of techniques for the forecasting of destructive natural events and of the accuracy and reliability of warning systems;
- (e) Development of improved methodologies for analysing the economic, social and environmental impacts of natural disasters and for developing prevention, mitigation and warning systems.

## III FUNCTIONAL TASKS

### A. ENVIRONMENTAL ASSESSMENT: EARTHWATCH

161. The sections of this report dealing with the Global Environmental Monitoring System (GEMS) and the International Referral System for sources of environmental information (IRS) will appear as UNEP/GC/31/Add.2 and Add.3 respectively.

### B. ENVIRONMENTAL MANAGEMENT

#### Introduction

162. The 1972 United Nations Conference on the Human Environment recommended the inclusion of "environmental management" as one of the two main functional tasks in the Action Plan it adopted. The Governing



Council, at its first and second sessions 7/, underlined the importance of environmental management and called for encouragement and support of an integrated approach to the planning and management of development, including that of natural resources, so as to take account of environmental factors and facilitate achievement of maximum social, economic and environmental benefits.

163. At this early stage, the concept of environmental management is still in the embryonic state, and its practice is limited and unevenly distributed. Thus one of UNEP's major objectives is to contribute to the evolution of the concept of environmental management, and to promote its practical application.

164. Just as the concept of environment, as embodied in the United Nations Environment Programme, is concerned with enhancing human welfare, environmental management may be described as the process by which the various components which bear on the state of the environment contribute to the enhancement of human welfare. Environmental management is thus not a matter simply of managing a single discrete element called "environment"; it involves the management of a whole system of relationships in which cause and effect are often separated by dimensions of space and time which transcend traditional institutional and disciplinary boundaries and perceptions.

165. Environmental management must provide a basis on which this total system of interactions can be subjected to conscious human direction and control. This requires a holistic framework within which the causes and effects attributable to particular elements and functions within the system can be perceived and evaluated, the flows of information required for decision-making established, and the nodal points at which decisions can most effectively impact on the system identified.

166. The first task of environmental management is to bring the environmental dimension into the exercise of each of the individual functions within the total system which affect its overall condition and direction. This involves ensuring that those responsible for each element or function have an understanding of their role within the system and of the ways in which the total system affects and is affected by their actions, as well as access to the relevant information from other parts of the system required to guide their decision-making. Environmental management should be seen as having to operate on the level of overall planning and on the level of specific actions, and it will be essential to find ways of connecting the levels.

167. Environmental management should be carried out in a fully integrated way. The decision to take any particular action should therefore always derive from full consideration of its total effects.

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7/ In response to the Governing Council decision 18 (II), the Executive Director, in co-operation with IIASA, is convening a small group of experts on environmental management at Laxenburg, Austria, 11-14 March 1975. The report of this meeting will be presented for information to the Governing Council at its third session.

168. A basic tenet of UNEP's approach to its Programme is that it is primarily through the development process that environmental goals are affected, either positively or negatively. Thus the main purpose is to improve the management of the development process, and UNEP is placing prime emphasis on the need to apply the concept of environmental management to this end. The choice between alternative strategies in managing the environment cannot be divorced from the choice among patterns of development in pursuing the goals of increasing man's economic and social welfare.

169. It follows from the concept of environmental management articulated above that for UNEP environmental management is more than simply another "functional task"; it lies at the heart of the purposes and objectives for which UNEP was established by Governments and is the principal methodology by which those purposes and objectives are to be achieved. Virtually all of UNEP's activities are designed to contribute to better environmental management on the part of Governments and others and to provide, within the context of a global system, the framework, information flows and support for decision-making they may require to play their proper part. Environmental management, therefore, permeates the entire UNEP programme and cuts across all of the different sectors and disciplines it includes.

170. The focus of this section of the proposed Programme is on sound comprehensive development planning and management as an integral part of the environment-development complex. The Level Three document, however, groups under the heading "Environmental Management" a number of projects deriving from a wider spectrum of programme activities.

#### Objectives

171. The programme objectives in this area are:

(a) To identify and examine the components of the development process which bear on the condition of the environment, and the linkages between such components, for the purpose of elaborating and evaluating alternative patterns of development and alternative choices in respect of particular development options;

(b) To identify and examine various "nodal points" of interaction and feedback, especially between population, resources, environment and development, and to recommend appropriate action;

(c) To orient scientific and technological research to assist in defining and evaluating the interacting relationships among such components and facilitate the process of technological choice;

(d) To assure the full integration of the environmental dimension in the process of development planning;

(e) To ensure incorporation of environmental criteria in the process of economic evaluation and management;

(f) To develop a body of curricula and teaching materials for education in environmental management;

(g) To develop a body of people educated and/or trained in environmental management.

### Strategy

172. In order to meet the above objectives, the strategy should be to add a new dimension to planning, information flows and decision-making, as well as to patterns of innovation, research and technological choice, particularly in relation to the development process. This can most frequently be done in practice by proposing an action which appears to offer beneficial results, evaluating all of its consequences throughout the total cause and effect system, feeding back the resulting evaluations and modifying the initial proposal accordingly until it is considered acceptable in terms of the benefits it is designed to achieve. This is the methodology which employs various forms and techniques of environmental impact assessment. In this context, the need is to understand fully the role of environmental variables in economic and social planning. This means that the environmental view must be defined clearly, both at the macro-level of planning and at the project level, and tools must be provided for formulating, implementing and carrying out plans and their components in accordance with this definition.

173. UNEP's own Programme will seek to provide a working example of environmental management in the global context and, through various individual activities carried out within the Programme, to encourage and support others both in the elaboration and evolution of new theory and concepts and in the development of practical working models.

174. The particular elements of the proposed strategy are as follows:

(a) In the process of the mid-term review of the International Development Strategy, to ensure that the environmental dimension is included in the Strategy and that its objectives are compatible with the goals set by the Stockholm Conference and the Governing Council for the protection and improvement of the human environment, and to study the implications of environmental management for the international economy, and the linkages between the new international economic order and environmental management;

(b) To ensure that the activities of international agencies such as FAO, UNCTAD, UNDP, WHO and the World Bank group reflect, to the maximum extent possible, the integrated approach to developmental and environmental objectives;

(c) At the country and regional levels, to promote the integrated approach to environment and development, and devise means for encouraging environmental policies that facilitate and support qualitative development at various levels (e.g. village, city, area, national, regional, global);

(d) To give emphasis to activities which will help define and clarify the ways in which the environmental dimension interacts with and conditions the development process;

(e) To ensure that each one of the activities within UNEP's programme reflects its overall approach to environmental management;

(f) To develop and elaborate the methodological aspects of environmental management, encourage their practical application to real situations and provide for feedback and evaluation of the experience obtained;

(g) To give strong emphasis to optimizing the resource conversion process with the ultimate goal of achieving the best utilization of the planet's resources on a sustainable basis and to examine the specific policies which can be visualized towards this end;

(h) To ensure that account is taken of the carrying capacity of particular eco-systems (the resiliency question) in the orientation to be given to patterns of local technology;

(i) To elaborate recommendations for the incorporation of economic, technological and social factors which contribute to environmental management, and to formulate appropriate principles and guidelines for incorporation in the development policies of governmental and other organizations concerned;

(j) To disseminate information on environmental methods, theories, recommendations and the results of practical experience.

### C. SUPPORTING MEASURES

#### 1. Information

##### Introduction

175. As most of the world's peoples are now being reached through some form of mass communication, it is technologically possible to inform them and involve them in solving many of the problems confronting mankind. To do so, however, requires effective co-operation with those who operate the channels of communication.

176. A vast majority of these communicators are already aware of the essential role of environmental factors in global survival. A trend towards more sophisticated interest in environmental matters has become apparent on the part of journalists, film makers, radio and television broadcasters, writers, programme planners, periodical editors, book publishers, public speakers, conference and exhibition organizers and information officers in Government and the United Nations system.

##### Objectives

177. The objective of the programme should be to increase consciousness and appreciation of environmental matters through support for national programmes among both particular special interest groups and the masses and to involve them in relevant action by preparing an information process appropriate to both environmental conditions and media requirements.

##### Strategy

178. To meet the needs of mass communicators as disseminators of environmental information, a programme of action is developing in six major areas:

(a) Preparation and provision of media reference services:

A pre-requisite of effective communication with mass communicators is the preparation of basic reference materials that provide factual profiles of environmental conditions in a form appropriate to media requirements. The production of prototype environmental fact files for journalists and audio-visual reference sources for broadcasters and film-makers is being expanded, and the participation of United Nations and governmental information services is being invited;

(b) Preparation and provision of media supportive materials:

Supportive media materials intended to provide a global dimension to coverage of local, national or regional conditions and events will be expanded and extended, particularly in the case of mass media supportive materials for World Environment Day;

(c) Establishment of effective liaison with media personnel and organizations:

Assessment of mass media attitudes towards environmental affairs, and determination of media needs for information, is being achieved by a programme of media liaison, which will be expanded, to provide a basis for information selection, materials design and effective delivery;

(d) Preparation of training and briefing seminars:

A joint programme of briefing seminars on particular environmental subjects and communication techniques, launched in co-operation with international and regional mass media organizations, is being expanded;

(e) Technical assistance for media infrastructures or information services:

Geographic or subject areas which require strengthening to reach their regional or thematic audience effectively will be considered for technical assistance and training programmes through collaboration between the United Nations system and appropriate media organizations;

(f) Implementation of a communications component in the planning and execution of environmental projects:

To increase the effectiveness of all environmental projects, the introduction of a communications component at both the planning and execution stages of each project is being encouraged and will become comprehensive;

(g) Materials for direct distribution:

Publication and other media materials, including audio-visual aids, will be produced for direct distribution.

179. Through the foregoing processes, the Executive Director can ensure the effective co-ordination of the environmental communication programme with the priorities, knowledge and actions of the substantive programme. In this way, communications disciplines and resources will work on behalf of as well as within the programme to provide communications support geared to programme implementation.

## 2. Education and Training

### Introduction

180. The Governing Council, at its first session, recognized the dual character of the programme in this area, and called for action programmes specifically for this item as well as programmes in training and education arising from and integrated with the other subject areas. Reiterating this at the Governing Council's second session, the Executive Director stated that "while training activity is necessary for each priority area and hence is an element common to all parts of the Programme, there should also be training programmes of a more general nature".

### Objectives

181. The basic objective of this area is the creation and enhancement of indigenous capabilities and capacities required to enable countries to identify and deal with the environmental aspects of their development. More specifically, the objectives are:

(a) To effect a rapid and systematic development of environmental education on a global basis; to provide training in specific areas of policy, programming and implementation of national and regional development plans based on properly developed methods including environmental dimensions;

(b) To create environmental awareness at the highest policy levels and hence at the levels of decision making in all sectors of development, in both the public and the private context, will be major objectives;

(c) To provide the education and training necessary to make it possible for all countries to be able to participate in all appropriate parts of the rest of the programme in an informed manner as equal partners;

(d) To establish means of inducing policy-makers, decision-makers, and administrators in the Governments of all countries to include environmental dimensions in the consideration of their policies, programmes and projects.

### Strategy

182. The Programme seeks the steady introduction of balanced environmental education patterns at school, college and university levels (aimed at the future "flow of skills" in society); and a widespread training network at global, regional and national levels (aimed at improving the current "stock of skills", i.e. the present management and decision-making cadres in society). As a support to this, the programme also seeks to develop recurrent education and training activities (adult, children and youth education, formal extra-mural courses, etc.) for various segments of society's work force and to promote essential research programmes in this area.

183. Certain research studies on special subjects, in collaboration with other substantive areas of programme activities, will be necessary in order to improve the content of education and training courses (e.g. methodologies for assessment of costs and benefits of environmental impact, - under the substantive subject area of "environment and development"); such studies (applied research) may become appropriate for research fellowships.

184. In accordance with the recommendations of the second session of the Governing Council 8/, the following programme is envisaged:

(a) Training activities will be provided, in co-operation with Governments, for the following groups:

- Officials at the policy level;
- Decision-makers and senior managers;
- Technicians and specialists (e.g. engineers, forest ecologists, game wardens, etc.);
- Professional workers (recurrent education);
- The public at large;

(b) Three channels will be used for furtherance of training and education activities:

- An increasing number of institutions of excellence in both developed and developing countries;
- Regional (and sub-regional) programmes, established through United Nations and related institutions;
- Symposia, seminars, workshops, etc., mainly through existing international and national institutions;

(c) The following activities will be carried out to and in the provision of education and training:

- Curriculum development;
- Teaching materials development;
- Actual education programmes through schools, universities, institutes, etc.;

(d) The instruments to be used in these activities are a mixture of:

- Fellowships for trainers and lecturers, with appropriate programmes developed for these individuals;
- Integrative and overview-type courses at post graduate levels, and, possibly, brief overview-type courses for graduate students of other disciplines;
- Courses in specialized areas of environment;
- Inputs at school level, through curricula and teaching materials programmes, with fellowships provided to trainers and teachers.

185. The aim is to combine fellowships abroad for persons already mature in the knowledge of their own environment with programmes in the developing countries themselves (wherein faculty staff from their own institutions would conduct country courses jointly with external experts provided, for brief periods, under UNEP's technical assistance programme).

### 3. Technical assistance

#### Introduction

186. The main thrust of technical assistance activities is to promote efforts on a global, regional or sub-regional basis. However, particular attention will also be given to requirements of individual countries, especially where such assistance would have implications extending beyond national boundaries.

187. Each country should have a role in developing global and regional information on environmental variables and in managing environmental matters with transnational importance. UNEP's technical assistance activities will therefore be directed towards assisting and influencing Governments in introducing environmental dimensions into development planning efforts. They will also aim at influencing other agencies at central, regional and country levels to consider environmental variables and problems both in their own terms and as aspects of development problems at all stages of the generation of their programmes. If appropriate assistance is provided, countries may be helped to manage their internal affairs better and to contribute appropriately in their part of the environmental programmes of UNEP.

188. Therefore, the form of assistance to be offered will be designed to meet specified needs, and will encompass all means of assistance, without rigid limitations or strict definitions of UNEP inputs; these will, however, normally include the provision of expertise, training fellowships, equipment, financial grants, information materials, and library facilities.

#### Objectives

189. The objective of technical assistance is to provide Governments with the skills they require in particular areas which accord with the priorities set by the Governing Council, for example, a given phase of pre-project or project development, and to assist in the transfer of such skills to counterpart elements in that society. By this means, the technical assistance effort seeks to make it possible for all countries to:

- (a) Participate fully in regional, transnational and global environment-related programmes;
- (b) Manage their own environment in accordance with their own aspirations and needs, in harmony with their development objectives and any international agreements to which they are parties;

#### Strategy

190. Where feasible, UNEP proposes to involve itself in the planning and implementation of technical assistance efforts by participating in country programming exercises.



191. To this end the technical assistance pattern as now envisaged contains the following broad components:

- (a) A range of technical assistance will be provided in response to the needs of developing countries to enable them to carry out their part of substantive programmes of UNEP. Inputs will be made to substantive projects by providing for the necessary training activities;
- (b) Requests from individual countries for assistance in a number of specific areas will be satisfied and "overview" assistance will be provided to help Governments identify overall environmental problems and formulate national policies and measures for dealing with them. Such assistance may initially take the form of short-term, pre-project or preparatory-phase type of technical assistance, decided in close consultation with the UNDP agency country programmes;
- (c) Assistance provided will be co-ordinated under the proposed "clearing house" system, which will maintain close contact with UNDP country programme and thus optimize the use of all inputs;
- (d) UNEP will act as a catalytic agent to establish special multi-lateral arrangements for working on specific problems among developed and developing country groups with common interests;
- (e) Technical assistance will be provided direct in special cases in which other mechanisms are not available, especially where the case does not fit within the general programme but is adjudged to be an emergency, or worthy of special assistance as an isolated case or example;
- (f) A small cadre of advisors is to be established in each region, in association with the UNEP regional representatives, to provide environmental advice and support to Governments, regional bodies and the UNDP country programming process, as well as to help define and meet technical assistance needs in the environmental field;
- (g) Study tours will be promoted in selected countries which have particularly useful experience in given areas of environment/development activities;
- (h) Studies will be made by environmental missions and missions from organizations such as UNDP, the regional economic commissions, the World Bank, the Ford Foundation, etc. to identify the needs of individual countries. These could be followed by a "technical assistance package" which would be integrated with the programmes and project of other agencies.

#### IV. DEVELOPMENT OF THE PROGRAMME

##### A. OUTER LIMITS

###### Objectives

192. Under this area, the Executive Director will, as directed by the Governing Council, continue his activities in seeking to increase knowledge and understanding of potential "outer limits".

###### Strategy

193. Initially, the programme strategy will be to pursue investigations of the following subjects:

- (a) Climatic change;
- (b) Weather modification;
- (c) Increase of bioproductivity;
- (d) Risk to ozone layer.

194. Other subjects will be treated under other appropriate parts of the programme - for example, toxic substances are dealt with in connexion with the IRPTC programme, biological tolerance will be treated under monitoring of environmental health.

##### 1. Climatic change

195. In view of the increasing evidence and concern about climatic changes (whether natural or caused by man's activities) and their effects on human health, food production and many other activities, an International Study Conference on Climatic Changes, was held in August 1974 in Stockholm, organized by the Executive Director together with WMO and ICSU. The Conference was directed towards planning the further development of numerical models of climate systems to be applied in:

- (a) Studies of climate predictability;
- (b) Studies of sensitivity of climate to various forms of "external" effects (such as the continued increase of CO<sub>2</sub> content of the atmosphere, thermal pollution);
- (c) Studies of the incidence, frequency and distribution of short-term climate extremes (e.g. floods, droughts).

196. The Conference summarized existing evidence of climatic changes and the physical processes involved, studied model sensitivity to parameterization schemes for cloudiness, radioactive processes, influences of CO<sub>2</sub> and aerosols, and considered the feasibility of monitoring the parameters involved. The Conference recommended that development of numerical high-resolution and low-resolution models of the global climate system should continue, diagnostic studies of climate indicators and physical processes should be undertaken, and field experiments to improve understanding of sub-grid processes should be organized, taking full advantage of the facilities available during the first GARP global experiment. It also recommended that systems for continuous

global collection of climatic data and for regular issue of derived maps and parameters should be arranged and that a list of variables determined by the Conference itself should be globally observed.

197. On the basis of the findings of this Conference, action has been initiated to develop a programme of work under the leadership of WMO in co-operation with other agencies concerned within and outside the United Nations system, such as UNESCO, ICSU, IIASA and IFIAS. This programme will include activities on certain aspects that could be started right away, as well as pre-programming activities to develop a programme of work for long-term activities.

198. The work which would be started right away would include topics such as:

(a) The design and execution of a numerical experimentation programme needed for such activities as the development of climate model parameterization techniques and comparison of climate models;

(b) Further definition of the various observational efforts identified by the Study Conference;

(c) Studies of possible climatic changes based on the available knowledge and the practical implications of these changes for food production;

(d) Studies of CO<sub>2</sub> and ozone processes, their implications on the climatic changes and the impact of man's activities on these processes.

199. The longer-term programme, for which pre-programming activities have already been started, would aim at:

(a) Improving our understanding of the various physical processes that are responsible for climatic changes;

(b) Assessing the probabilities of various possible climatic changes;

(c) Providing the additional climatological information needed for assessing the practical significance for mankind of possible climatic changes and of man's impact on climate.

## 2. Weather modification

200. Following the directives of the Governing Council, the Executive Director consulted with WMO, which agreed to widen the scope of a planned meeting on weather modification to include discussions of the legal aspects. It was also agreed that legal experts designated by UNEP would be included in the panel of experts taking part. This meeting took place at Toronto last October and considered the desirability of developing general principles and operative guidelines on research into and control of man-induced weather modification.

201. On the scientific aspects of the discussion, the WMO experts prepared an amplified statement on the "present state of knowledge and possible practical benefits in some fields of weather modification", and recommended a programme in this area to be implemented by WMO in consultation with other international organizations, particularly the United Nations, FAO, UNDP, UNEP and UNESCO, and also with some interested non-Governmental organizations such as IAMAP, the Aspen Institute for Humanistic Studies and the Rockefeller Foundation. The programme is concerned among other things, with the collection of data necessary to establish a register of weather modification experiments or operations and the scientific planning of a few large-scale multinational experiments.

202. Furthermore, the experts recommended that WMO should sponsor, jointly with IAMAP, another scientific conference on weather modification which would take place at Colorado Springs from 23 to 27 August 1976.

203. On the legal aspects of the discussion, the panel welcomed the initiation of an interchange of views between WMO and UNEP on legal aspects of weather modification and recommended that such a dialogue should continue, since it is essential that international legal principles and guidelines on weather modification should be considered hand in hand with the scientific advancement of the subject.

204. It is therefore proposed that the following strategy be followed:

(a) Consultations will be continued towards development of legal provisions which would define the responsibility of States to ensure that weather modification experiments and operations within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of national jurisdiction;

(b) The Executive Director will continue to consult with WMO and other scientific and legal experts as necessary the desirability of developing general principles and operating guidelines on weather modification experiments and operations. He proposes a meeting between scientists and legal experts to develop such principles and guidelines. The question of calling an intergovernmental meeting to approve such principles and guidelines would be considered at a later stage, after consensus is reached between scientists and legal advisers.

### 3. Increase of bioproductivity

205. At present, green plants utilize only 0.1 to 0.2 per cent of the light energy that reaches the earth. A little more is used in the production of agricultural plants - from 0.5 to 1.0 per cent. However, better crops and plantations use 4 to 5 per cent of solar light energy. Theoretically, it is possible to raise the efficiency of solar energy utilization to 6, 8 or even 10 per cent. If the total production of green plants on earth could be raised from the present 100 thousand million tons to 125-130 thousand million tons, which is a realistic objective, this would be of great importance in coping with the food problem facing mankind.

206. Therefore, the following strategy is proposed:

(a) Particular attention will be given to studies on the mechanism of photosynthesis and its genetics and the application of this knowledge to effect a radical change in wild or cultivated green plants;

(b) A survey of the existing knowledge on the subject will be prepared in co-operation with the scientific community (ICSU, SCOPE, IUBS), and practical steps will be worked out in co-operation with FAO to develop knowledge in this area and to apply existing knowledge with a view to identifying areas where further research is required.

#### 4. Possible risks to the ozone layer

207. The ozone layer in the stratosphere is of particular importance because it not only controls stratosphere temperature but shields life on earth against the harmful effects of ultraviolet radiation. Any change in the concentration of ozone should therefore be a matter of concern, and should be carefully monitored and studied.

208. The Executive Director therefore proposes to develop the following programme in consultation with WMO:

(a) Information will be compiled on the work so far done in monitoring the ozone in the stratosphere and the research aimed at assessing the risks to which the stratosphere is exposed;

(b) A decision will then be made on what action needs to be taken to improve our understanding of the ozone processes and the effects of man's activities on that vital layer.

### B. INTERNATIONAL ENVIRONMENTAL LAW

#### Introduction

209. At its second session, the Governing Council recognized that solutions to many environmental problems are dependent on the existence of adequate law relating to the environment. Indeed, effective international action in the field of the environment presupposes the conclusion of new agreements and conventions, implementation of recommendations and rules agreed to by States, and efforts to find new solutions and new forms of international co-operation and regulation.

210. While UNEP has no clear-cut, formal mandate to develop international law of the environment, it has a task to promote the development and implementation of such law, in collaboration with Governments and intergovernmental bodies concerned, to permit effective implementation of its strategies, policies and recommendations. A crucial link in the environment strategy is the development of international instruments, including international environmental law. This is a task that will grow in importance and as the international programme on the environment progresses from perception of problems to their study and understanding to agreement on concrete actions and solutions, and finally to their implementation.

### Objectives

211. In fulfilment of the UNEP role in relation to international environmental law, the programme is designed to meet the following objectives:

(a) To contribute towards the development and codification of a new body of international law, to meet new requirements generated by environmental concerns and by the international strategy in the field of the environment, based particularly on the Declaration of Stockholm;

(b) To facilitate co-operation among States for the development of international law regarding responsibility, liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of States to areas beyond the limits of their jurisdiction, in accordance with Principles 21, 22, 23 and 24 of the Stockholm Declaration;

(c) To contribute towards the development of environmental law on the national and regional levels;

(d) To promote the protection of international commons and the regulation of their use from the environmental point of view;

(e) To work towards establishment of guidelines and procedures for the avoidance and settlement of environmental disputes;

(f) To study institutional structures related to environmental concerns, with the aim of devising efficient new mechanisms or improving the existing ones.

### Strategy

212. The development of international environmental law calls for simultaneous and co-ordinated action on a variety of fronts and at different levels of generality, over an extended period of time. It requires close collaboration between Governments and intergovernmental bodies. It calls for participation of organizations and bodies within the United Nations family, intergovernmental and non-governmental organizations, universities, research institutes, national and international societies of international law and individual experts.

213. Among the broad lines of action proposed for this comprehensive effort are the following:

(a) A systematic collection will be made of data and information with the aim of creating a base for action, and for formulation, proposal and promotion of general principles, legal rules and instruments;

(b) Further elaboration will be fostered of general principles adopted at the Stockholm Conference, in UNEP and elsewhere, and their utilization in specific contexts (compensation, transfer of costs, liability for damage, responsibility for preventing environmental damage, natural resources shared by two or more States etc.);

(c) International agreements or conventions will be promoted to deal with global environmental concerns (weather and climate modification, exploitation of sea-bed, etc.);

(d) International agreements or conventions, bilateral and multilateral, will be promoted to deal with specific environmental problems in given geographical contexts (international rivers and river basins, enclosed and semi-enclosed seas, trans-frontier pollution, groundwaters, etc.);

(e) Efforts will be made by international organizations and fora to take the environmental law aspect into account in their work;

(f) Comparative studies will be conducted of national environmental protection law, as a means of generating ideas and rules for wider application by countries in their national contexts as well as for adaptation to the requirements of international environmental law;

(g) Mechanisms and arrangements will be developed for international co-operation on a voluntary basis to deal with specific environmental issues in ways that will facilitate evolution of environmental law in respect of such issues;

(h) Technical assistance will be provided to developing countries for the development of their environmental legislation.

#### C. COMPREHENSIVE THEORY OF COMPARATIVE RISK

##### Objectives

214. As stated in document UNEP/GC/14/Add.2, the objectives of this part of the Programme are as follows:

(a) To develop a theoretical framework for the analysis of risks, in order to make it possible to compare the impacts and problems posed by different kinds of risks in such a way that groundwork may be laid for the allocation of resources to the control of risk or alleviation of consequences;

(b) To understand the perception of risk and the factors entering into such perception in the light of the theoretical framework.

##### Strategy

215. The problem is being approached through theoretical analysis and consultation with expert groups, through SCOPE.

#### D. TREES

##### Objectives

216. The objective of this portion of the Programme is to develop a worldwide programme for the protection and planting of trees and afforestation generally as a means of improving the environment, conserving soil and improving hydrological conditions.

### Strategy

217. The strategy for this programme envisages the following activities:

(a) A worldwide campaign will be launched to interest people in this activity, to encourage national campaigns and to provide them with the necessary information and material;

(b) Information and materials are to be assembled and demonstrated to help in selection of appropriate trees for particular ecosystems;

(c) Measures will be taken to help ensure the provision of planting stock at proper places and times;

(d) A programme of education will be undertaken to help people understand the role of trees in the environment.

218. This activity would be pursued in conjunction with FAO and the appropriate non-governmental organizations.

### E. DEVELOPMENT OF OFFSHORE RESOURCES

### Objectives

219. This programme aims at developing an internationally useful set of guidelines for proper environmental safeguards and environmentally sound behaviour in the exploration for and exploitation of offshore resources including petroleum and manganese nodules.

### Strategy

220. Development of these guidelines is envisaged by means of the following strategy:

(a) Practices, guidelines, standards and rules now in use around the world will be collected and documented;

(b) This collection of materials will be analysed by a group of experts chosen on the basis of professional qualifications and nominations of Governments;

(c) On the basis of the technical analysis experts will develop a set of guidelines for international use.

221. This activity would be pursued in co-operation with Governments, the industries involved, and UNIDO.



## F. ANTARCTICA

### Objectives

222. The objective of this Programme is to work with Governments to prepare for the extension of the Antarctic Treaty of 1 December 1959, with special attention being given to ensuring that full and adequate provision is made for protection of the environment, particularly in relation to the possible exploitation of the natural resources of the Antarctic region.

### Strategy

223. In fulfilment of that objective, the following strategy is proposed:

- (a) Preliminary consultations will be held with the Governments involved and with other concerned Governments;
- (b) An expert group will be convened, including nominees from Governments, to draw up proposed guidelines for exploration and exploitation;
- (c) A group of legal experts will be convened, including nominees from Governments, to draw up proposed legal articles to be included in treaty extension.
- (d) Consultations will be held with Governments concerning these articles with a view to their inclusion in the treaty extension.