



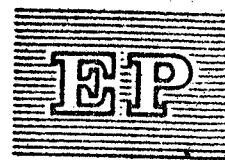
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THE ENVIRONMENT PROGRAMME (LEVELS ONE, TWO AND THREE)

Report of the Executive Director

This report is the basic substantive document on recent developments in and proposals for future activities of the environment programme. The Executive Director has in this document combined the presentation of the three levels of the programmatic process, previously reported on separately. The subject matter has also been reordered to give a better reflection of the relationship between the parts of the programme. These changes are described in the introduction to the report. The major policy issues for the attention of the Governing Council are brought together at the beginning of the document, and outlined at the end of each section. Annex III contains a suggested draft decision on these issues.

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ABBREVIATIONS

ACC	Administrative Committee on Co-ordination
ACMRR	Advisory Committee of Experts on Marine Resources Research (FAO)
ADI */	Asian Development Institute
ALECSO	Arab League Educational, Cultural and Scientific Organization
AWLF	African Wildlife Leadership Foundation
CDCC	Caribbean Development Co-operation Committee
CEI	Centre for Industrial Studies, Geneva
CERI	Centre for Educational Research and Innovation
CGIAR	Consultative Group on International Agricultural Research
CHBP	Centre for Housing, Building and Planning (United Nations Department of Economic and Social Affairs)
CIAT	International Centre for Tropical Agriculture
CIB	International Council for Building Research, Studies and Documentation
CIREN	International Research Centre on Environment and Development, Paris
CMEA	Council for Mutual Economic Assistance
COWAR	Scientific Committee on Water Research
ECA	Economic Commission for Africa (United Nations)
ECDIN	Environmental Chemical Data and Information Network (European Communities)
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
ELB */	Non-governmental Organizations' Environment Liaison Board
EMASAR	Ecological Management of Arid and Semi-Arid Rangelands (FAO)
ESCAP	Economic and Social Commission for Asia and the Pacific
FAO	Food and Agriculture Organization of the United Nations
FGGE	First GARP Global Experiment
GARP	Global Atmospheric Research Programme
GDR */	German Democratic Republic

*/ In foot-notes only.

ABBREVIATIONS (continued)

GEMS	Global Environmental Monitoring System
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Pollution (United Nations, FAO, UNESCO, WHO, WMO, IMCO and IAEA)
GIPME	Global Investigation of Pollution In the Marine Environment
IADIZA	Argentine Arid Zones Research Institute
IAEA	International Atomic Energy Agency
IAMS	International Association of Microbiological Societies
IARC	International Agency for Research on Cancer
IATFD	Inter-Agency Task Force on Data
IBP	International Biological Programme
IBPGR	International Board for Plant Genetic Resources
ICAITI	Central American Research Institute for Industry
ICAO	International Civil Aviation Organization
ICBP	International Council for Bird Preservation
ICES	International Council for the Exploration of the Sea
ICIPE	International Centre for Insect Physiology and Ecology
ICRO	International Cell Research Organization
ICRP	International Commission on Radiation Protection
ICSU	International Council of Scientific Unions
ICTV	International Committee on Taxonomy of Viruses
IDEP */	African Institute for Economic Development and Planning, Dakar
IDRC	International Development Research Centre
IDS */	Institute of Development Studies
IFIAS	International Federation of Institutes for Advanced Study
IGOSS	Integrated Global Ocean Station System
IHP	International Hydrological Programme (UNESCO)
IIASA	International Institute for Applied Systems Analysis
IIED	International Institute for Environment and Development
IITA	International Institute of Tropical Agriculture
ILCA	International Livestock Centre for Africa
ILO	International Labour Organisation
IMCO	Inter-Governmental Maritime Consultative Organization

*/ In foot-notes only.

ABBREVIATIONS (continued)

INTECOL	International Association for Ecology
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IPAL	Integrated Project on Arid Lands (UNESCO)
IRRI	International Rice Research Institute
IRPTC	International Register of Potentially Toxic Chemicals
IRS	International Referral System for sources of environmental information
IUCN	International Union for Conservation of Nature and Natural Resources
ISSS	International Society of Soil Sciences
IUFRO	International Union of Forestry Research Organizations
IWC	International Whaling Commission
IWRB	International Wildfowl Research Bureau
MARC	Monitoring and Assessment Research Centre, Chelsea College, London
MEDI	Marine Environmental Data and Information System
MIT	Massachusetts Institute of Technology
NATO	North Atlantic Treaty Organization
NIOSH	National Institute for Occupational Safety and Health (United States of America)
NRDC	Natural Resources Defense Council (United States of America)
OAS	Organization of American States
OECD	Organization for Economic Co-operation and Development
PAHO	Pan-American Health Organization
SCOPE	Scientific Committee on Problems of the Environment (ICSU)
SCORD	Scientific Committee on Recombinant DNA Research (ICSU)
SEPA	Science Education Programme for Africa
SIDA	Swedish International Development Agency
UNA/USA */	United Nations Association of the United States of America
UNDP	United Nations Development Programme
UNDRO	Office of the United Nations Disaster Relief Co-ordinator
UN/ESA */	United Nations Department of Economic and Social Affairs
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Fund for Population Activities
UNHHSF	United Nations Habitat and Human Settlements Foundation
UNICEF	United Nations Children's Fund

*/ In foot-notes only.

ABBREVIATIONS (continued)

UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
UNRISD	United Nations Research Institute for Social Development
WFCC	World Federation of Culture Collections
WFP	World Food Programme
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization
WWF	World Wildlife Fund
WWW	World Weather Watch (WMO)

COMPENDIUM OF MAJOR POLICY ISSUES FOR
THE ATTENTION OF THE
GOVERNING COUNCIL

For ease of reference, the issues on which the Governing Council may wish to focus its discussion of the individual chapters and sections of this report are grouped below under the appropriate chapter and section headings. These are also indicated at the end of chapter I and of subsequent sections.

Chapter I

INTRODUCTION

The integration of the three levels of the programmatic process into one report (paragraphs 1-5).

The rearrangement of the order of items so as to reflect better the relationship between priority subject areas and functional tasks (paragraphs 6-8).

Chapter II

ENVIRONMENTAL ASSESSMENT

A. EARTHWATCH

The explanation of the general concept of Earthwatch especially in relationship to outer limits and basic human needs (paragraphs 11-19).

GEMS - The response to Governing Council decision 63 (IV) (paragraphs 28-34)

IRS - The proposed revision of the objectives and strategies for IRS and the need for more active participation by Governments in the system (paragraphs 71 and 73-78)

Basic human needs - The proposed objectives and strategies for the assessment of basic human needs (paragraph 112)

Outer limits - The plans for a more coherent programme in climatic changes (paragraphs 126-134), recommendations regarding the programme of action on risks to the ozone layer (paragraph 140), and proposals in the area of bioproductivity (paragraphs 144-146).

B. ENVIRONMENTAL DATA

The proposals to develop an environmental statistics and other environmental data collection systems and the need for active Government interest in them (paragraphs 160-164).

The improvement of data collection for the Level One exercise and the state of the environment reports (paragraphs 165-166).

Chapter III

PRIORITY SUBJECT AREAS

A. HUMAN SETTLEMENTS AND HUMAN HEALTH

The proposed revision of the objectives and strategies for human settlements in the light of the recommendations of the Habitat Conference and the outcome of the Level One overviews (paragraph 180).

The arrangements for establishing regional networks of institutions to develop, apply and exchange information about environmentally sound and appropriate human settlements technologies (paragraph 188).

The advisability of the continuation, in addition to work in the areas of concentration, of some actions in the control of communicable and non-communicable diseases through environmental intervention and control of occupational health hazards (paragraphs 222-227).

The order of priorities in pest management as presented in the summary of the Level One overview (paragraph 232).

B. TERRESTRIAL ECOSYSTEMS

The increased emphasis put on demonstration and field actions in such areas as tropical woodlands and forests (paragraphs 281-286), soils (paragraphs 318-319) and water (paragraphs 335-340 and 349).

In the sub-section on tropical woodlands and forests, the plan of action on "Trees" (paragraphs 288-290).

In the sub-section on arid and semi-arid ecosystems:

- (i) The intention to concentrate effort around EMASAR, IPAL and desert encroachment in the Sudan (paragraphs 262-269);
- (ii) The actions in the field of firewood and substitutes (paragraph 270 (a)).

In the sub-section on soils:

- (i) The timeliness of the shift in emphasis from assessment to management actions (paragraphs 318-319);
- (ii) The increased importance given to the rehabilitation of mined areas (paragraphs 320-321).

In the sub-section on water, the intention to give greater attention to health aspects (paragraph 335-338 and 340).

In the sub-section on genetic resources:

- (i) The increasing importance given to microbiology in environmental management (paragraphs 358-364);
- (ii) The emphasis on co-ordinating mechanisms (paragraphs 358, 365, and 368).

In the sub-section on wildlife and protected areas:

- (i) The integration of all activities related to the conservation of ecosystems and their biotic resources (paragraphs 252 and 382);
- (ii) The current and planned actions relating to legislation (paragraphs 389-391).

C. ENVIRONMENT AND DEVELOPMENT

The planned seminars on alternative patterns of development and life styles (paragraphs 400-401).

The steps taken or planned to encourage international organizations to be more responsive to environmental considerations (paragraphs 409-415).

Planned actions on the rational use of natural resources (paragraphs 421-422).

The proposal for a network of institutions involved in the development of environmentally sound and appropriate technologies (paragraphs 429-435).

The report on the outcome of the consultative meeting on the environmental problems of specific industries and proposals for future activities in this area (paragraphs 442-454).

D. OCEANS

The increased prominence which it is proposed to give to the better protection, management and utilization of living marine resources (paragraphs 475-487).

The adoption of guidelines for action plans for all marine regions, comprising an assessment and supporting activities component (paragraph 489).

The progress being made in each of the regional seas and the Executive Director's intention to establish a programme activity centre to guide future work (paragraphs 493-516).

E. ENERGY

The proposed plan for the updating of the review of the impact of extraction, conversion, transport and use of energy on the environment (paragraphs 531-533).

F. NATURAL DISASTERS

The proposed concentration on improvement of early warning systems and application of existing techniques to disaster prevention (paragraphs 552 and 555).

Chapter IV

SUPPORTING MEASURES

A. ENVIRONMENTAL EDUCATION

Preparations for the intergovernmental conference on environmental education (paragraph 563).

Plan to develop the regional programme activity centres in environmental education and training (paragraphs 566-567).

B. ENVIRONMENTAL TRAINING

The effectiveness of the training activity in various parts of the environment programme in meeting the needs of developing countries (paragraphs 575 and 580).

C. INFORMATION

Steps taken to improve communication with Governments (paragraphs 588 and 602).

The steps taken to extend UNEP's publishing capacity (paragraphs 587-592).

The reorientation of World Environment Day activities (paragraphs 597-600).

D. TECHNICAL ASSISTANCE

The provision of technical assistance through Fund programme activities to enable Governments to take part in activities of major global and regional importance (paragraph 614).

The provision of technical assistance on general environmental policy, administration and legislation (paragraph 613), other requests for assistance in technical fields being met through the regional advisory teams or short consultancies (paragraph 611) and the clearing house facility (paragraph 610).

Chapter V

ENVIRONMENTAL MANAGEMENT INCLUDING ENVIRONMENTAL LAW

A. ENVIRONMENTAL LAW

The report on the study on liability and compensation for environmental damage (paragraph 639 (b)).

The proposed plans for the introduction of environmental law into universities and research institutions, especially in developing countries for the period 1977 to 1979 (paragraph 644).

B. ENVIRONMENTAL MANAGEMENT

The proposal for the further development of environmental management concepts, and their practical application (paragraphs 652-654).

The proposals for regional approaches to environmental management (paragraphs 659-660).

The proposal that a systematic effort be made to achieve a linkage between the outputs of the programme, i.e. research studies, field projects and methodology reviews, and the functional task of environmental management (paragraphs 661-663).

Chapter I

INTRODUCTION

A. THE INTEGRATION OF THE THREE LEVELS

1. In the past, the substance of the activities of the United Nations Environment Programme has been put before the Governing Council in three reports, one for each of the three levels of the programmatic process. 1/ Taking account of the Governing Council's observations at its fourth session, the advice of the informal working group on documents established during that session, and Governments' written views received since, the Executive Director believes that it is now time to consolidate the presentation of the three levels into one document.

2. Therefore, instead of giving an account of work at each level in turn, this report is arranged by chapters and sections for priority subject areas and functional tasks. With the fewest possible exceptions, the text for each sub-area of these areas and tasks follows the sequence:

(a) A digest of the Level One review, where this has been undertaken, stressing particularly the major inadequacies in knowledge and action;

1/ Documents from previous sessions relating to each level are as follows:

Level One

- UNEP/GC/14/Add.1: Review of the environmental situation and of activities relating to the environment programme (second session)
- UNEP/GC/30: Review of the environmental situation and of activities relating to the environment programme (third session)
- UNEP/GC/60: Review of the activities relating to the environment programme (fourth session)

Level Two

- UNEP/GC/5: Action plan for the human environment: programme development and priorities (first session)
- UNEP/GC/14/Add.2: The environment programme (second session)
- UNEP/GC/31: The proposed programme (third session)
- UNEP/GC/61: Review of the status of the programme (fourth session)

Level Three

- UNEP/GC/8: Review and approval of the Fund programme 1973-1974 (first session)
- UNEP/GC/17/Rev.1: Review and approval of the Fund programme for 1974 and 1975 (second session)
- UNEP/GC/32: Proposed Fund programme activities (revised 1975, proposed 1976-1977) (third session)
- UNEP/GC/62: Proposed Fund programme activities, 1976-1977 (fourth session).

(b) A cross-reference to the approved Level Two objectives and strategies, and a recapitulation of the concentration areas; 2/

(c) A statement of Level Two "activities" (distinguishing those falling within concentration areas) with explanatory accounts. Here will be found much of the substance of the document, explaining actions which have been completed, 3/ are under way or planned, whether or not carried out with support from the Fund of UNEP. 4/ Wherever possible, terminal dates are given for activities; even though this is not practicable in every case, the phasing provided will enable the Governing Council to identify critical points in implementation of each part of the programme and thus the matters on which detailed reports may be expected in the years ahead;

(d) A paragraph of cross-references to the proposed Fund programme actions described under the account of activities (i.e. Level Three).

Finally, at the end of each section, a single paragraph draws the Governing Council's attention to the major policy issues referred to in the preceding text. These paragraphs have been assembled in the summary given at the start of this report.

3. This presentation brings out more clearly than hitherto the relationship between the inadequacies identified at Level One and the programmes of action at Levels Two and Three. In some cases it will be apparent that only part of the problem identified at Level One has been addressed. There are two reasons for this:

(a) The emphasis which the Governing Council and the Executive Director have put upon concentration in circumscribed areas means that many issues have yet to receive their share of attention;

(b) The Governing Council agreed that Level Two and Three activities should be developed for each area and task of the programme before completion of the relevant Level One reviews, the first cycle of which will not be finished until the sixth session. Thus some on-going activities do not respond directly to the priorities which have been, or may be, identified at Level One; indeed some of the agreed objectives and strategies may need revision when the Level One reviews are completed.

4. As noted by the Governing Council at its second session, 5/ the use of "activities" as a heading under which to describe actions at Levels Two and Three should clarify the initiated and planned actions, and hence the short-term direction and likely output of the programme. Since the relationship between objectives, strategies and activities may not be immediately apparent, a glossary of these and other terms is given at annex I.

2/ All approved objectives, strategies and concentration areas have been reissued in a single compendium (UNEP/GC/INFORMATION/1) for convenience, and therefore the cross-reference made in the text is to that document rather than to the original Governing Council documents.

3/ This document reports on action undertaken by 31 January 1977. Subsequent developments will be reported in addenda.

4/ The description of completed Fund-supported activities is kept very brief because a fuller account has been, or is, given elsewhere; for example at the fourth session of the Governing Council in document UNEP/GC/68, at the fifth in document UNEP/GC/96, and from 1 January 1977 in the UNEP/FUND PROJECT/- series issued with Report to Governments.

5/ See document UNEP/GC/14/Add.2, chap. I, para. 9.

5. The consolidation of Levels Two and Three enables a single story to be told, but it is nonetheless essential that Level Three activities be clearly distinguished from those of Level Two. In the case of approved Fund projects, this has been done by a brief summary of relevant information, given as a footnote to the reference in the text thus:

FP/1301-75-04/Global/FAO/37,000/35,000/X'75-X'76/GC/68. The seven items of information referred to in this way are:

- (a) The project number;
- (b) The region covered by the project;
- (c) Co-operating agency(ies), supporting organization(s) or internal project;
- (d) The total cost of the project;
- (e) The cost to the Fund of UNEP;
- (f) The period covered by the project (month and year);
- (g) The document wherein further details may be found.

All proposed Fund programme activities, including extensions to approved ones, are identified as explained in paragraph 2 (d) above, and consolidated in a table at annex II. Annex III, the draft decision, includes a suggested apportionment by the eleven major headings for Fund allocations.

B. CHANGES IN THE ORDER OF CHAPTERS AND SECTIONS

6. The opportunity has also been taken to depart from previous practice in the order in which functional tasks and priority subject areas are reported upon. Hitherto, an account has been given of, first, the six priority subject areas 6/ and then four functional tasks. 7/ Continuing development of the programme has suggested that this order obscures the logical sequence of the environmental approach and confuses the relationship between priority areas and functional tasks. This relationship is complex, but in essence involves:

- (a) Assessing environmental problems and trends;
- (b) Undertaking activities under each priority subject area to identify the management action required to deal with the problems;
- (c) Stimulating measures to support assessment and management;
- (d) Consolidating management experience gained through activities in priority subject areas in guidance on environmental management.

7. This is not a rigid sequence, and in practice activities have been initiated simultaneously in each of the four areas. Nevertheless, the Executive Director believes that the stages of the process should now be reflected in the presentation of the environmental programme. Accordingly, the rest of this document is in four chapters:

Chapter II: Environmental assessment (sections on Earthwatch and environmental data)

Chapter III: Priority subject areas (sections on each of the six areas already identified)

6/ Human settlements and human health; terrestrial ecosystems; environment and development; oceans; energy; natural disasters.

7/ Environmental assessment; environmental management; environmental law; supporting measures.

Chapter IV: Supporting measures (sections on environmental education, environmental training, information and technical assistance)

Chapter V: Environmental management, including environmental law (sections on environmental law and environmental management)

8. Though this order does not, of course, imply a change in programme priorities, it does differ from that used previously in reporting to the Governing Council. The following table will facilitate comparison between the order of chapters and sections in this report and that in the Level Two and Three documents at the previous two sessions of the Governing Council:

Chapter and section order used in this report	Equivalent order used in documents UNEP/GC/31, UNEP/GC/32, UNEP/GC/61 and UNEP/GC/62 8/
<p>I. <u>Introduction</u></p> <p>II. <u>Environmental assesement</u></p> <p>A. Earthwatch</p> <p>B. Environmental data</p> <p>III. <u>Priority subject areas</u></p> <p>A. Human settlements and human health</p> <p>B. Terrestrial ecosystems</p> <p>C. Environment and development</p> <p>D. Oceans</p> <p>E. Energy</p> <p>F. Natural disasters</p> <p>IV. <u>Supporting measures</u></p> <p>A. Environmental education</p> <p>B. Environmental training</p> <p>C. Information</p> <p>D. Technical assistance</p> <p>V. <u>Environmental management including Environmental law</u></p> <p>A. Environmental law</p> <p>B. Environmental management</p>	<p>I. <u>Introduction</u></p> <p>III. <u>Functional tasks:</u> A. Environmental assesment (Earthwatch)</p> <p>(part formerly under <u>Functional tasks:</u> B. Environmental management, part formerly in Level One report)</p> <p>II. <u>Priority subject areas</u></p> <p>A. Human settlements and human health</p> <p>B. Terrestrial ecosystems, their management and control</p> <p>C. Environment and development</p> <p>D. Oceans</p> <p>E. Energy</p> <p>F. Natural disasters</p> <p>III. <u>Functional tasks:</u> D. Supporting measures</p> <p>III. <u>Functional tasks:</u> C. Environmental law</p> <p>III. <u>Functional tasks:</u> B. Environmental management</p>

8/ All these reports also contained one or more extra chapters, but these related to such matters as a draft decision and the future development of the programme, and are not relevant to the purposes of the table.

C. MAJOR POLICY ISSUES FOR THE ATTENTION OF THE GOVERNING COUNCIL

9. The Governing Council may wish to focus its policy discussion of this chapter principally on the following issues:

(a) The integration of the three levels of the programmatic process into one report (paragraphs 1-5);

(b) The rearrangement of the order of items so as to reflect better the relationship between priority subject areas and functional tasks (paragraphs 6-8).

Chapter II

ENVIRONMENTAL ASSESSMENT

10. This chapter is in two sections, Earthwatch and Environmental data. Earthwatch is the term for global environmental assessment. The inclusion of a section on environmental data is new to the programme document; it brings together an account of several activities relating to the handling and use of environmental data previously reported in the Level One document and in the section on environmental management at Level Two. The inclusion of all environmental data activities under the chapter on assessment should enable the Governing Council to see more clearly how they relate to Earthwatch and facilitate environmental assessment at the national level.

A. EARTHWATCH

1. Introduction

(a) General concepts

11. In his report to the Governing Council at its fourth session, the Executive Director defined Earthwatch as:

"a dynamic process of integrated environmental assessment by which relevant environmental issues are identified and necessary data are gathered and evaluated to provide a basis of information and understanding for effective environmental management". 1/

12. Earthwatch, being a Level Two functional task, is a far broader concept than just the set of activities undertaken with the direct support of UNEP; it reflects the existence and continuing development of a multitude of research, monitoring, information exchange and evaluation activities undertaken by governmental, intergovernmental and non-governmental organizations round the world. The job of UNEP is to develop an operational framework for Earthwatch which will guide and co-ordinate these activities.

13. The four components of Earthwatch were described in general terms in the report of the Executive Director to the fourth session of the Governing Council. 2/ Monitoring systems generate a continuous flow of information about the condition of the environment. Research leads to a better understanding of environmental processes and facilitates interpretation of environmental data. Information exchange is an obvious requirement if the benefits of monitoring and research are to be enjoyed by all. Review is an analytic process which permits the definition of problems and the identification of gaps in knowledge and understanding. Evaluation, a term that has sometimes been used as synonymous with review, is a synthetic process involving the collation, correlation and interpretation of the results of monitoring and research; thus evaluation is the culmination of the assessment process, providing one of the main inputs to the policy formulation and planning functions of environmental management. 3/

1/ UNEP/GC/61, para. 231.

2/ Ibid., paras. 234-239.

3/ The terms used in this paragraph are defined in the glossary (annex 1).

14. At its fourth session the Governing Council, noting the advances made in monitoring and information exchange, called for the development and initial implementation of integrated programmes in research and evaluation. 4/ The action taken in this regard is reported on below (sub-sections 2 (c) and 2 (d)).

15. The fourth session of the Governing Council added a new dimension to the concept of Earthwatch. It reaffirmed that the greatest challenge today was to design development which, while satisfying basic human needs - beginning with the eradication of poverty - protected, and indeed wherever possible enhanced, environmental quality and did not transgress the global or regional outer limits imposed by the capacities of the biosphere. 5/

16. This perception is directly relevant to the assessment function, because it is through assessment that mankind's success in meeting this challenge can be measured and kept under review. More precisely, assessment is concerned both with the impact of human activities on the environment and with the capacity of the biosphere to support those activities on a sustained basis - that is, within the outer limits.

17. Last year the strategy for the integrated approach to environment and development in the priority subject area of Environment and development contained this element:

"to undertake, together with others, the formulation of principles and strategies for ensuring achievement of basic human needs for all over the next twenty-five years without an unacceptable level of environmental degradation". 6/

18. This year, so as to highlight the importance of monitoring the non-satisfaction of basic human needs, especially in relation to environmental quality and availability of natural resources, an account of the progress and plans for the assessment of basic human needs is included in the Earthwatch section (see paragraphs 107-117 below). The challenge to which the Governing Council referred (see paragraph 15 above) will be met by developing and refining the assessment of needs and limits to give a fuller understanding of the extent to which needs are not satisfied and threats are posed to the biosphere.

(b) Objectives, strategies and concentration areas

19. At its third session, the Governing Council endorsed 7/ the objectives and strategies for Earthwatch as a whole; these have been summarized elsewhere. 8/ Objectives and strategies for the component parts of Earthwatch are referred to in the appropriate sub-sections.

20. At its fourth session, the Governing Council agreed that the following parts of Earthwatch should be concentration areas:

(a) Ensuring the development of the various components of Earthwatch;

(b) Continued implementation of the Global Environmental Monitoring System (GEMS), which was already operational in a number of areas;

(c) Activation of the operation of the International Referral System (IRS);

4/ Decision 63 (IV), sub-para. (b).

5/ Decision 47 (IV), sect. IV, para. 1.

6/ UNEP/GC/61, para. 155 (g).

7/ Decision 29 (III), para. 1.

8/ See UNEP/GC/INFORMATION/1, sect. II A.

(d) Evaluation of outer limits to man's activities, particularly in respect of climatic changes, weather modification, risks to the ozone layer, bio-productivity and social outer limits, ^{9/} with emphasis on the relationship between outer limits, the tasks of Earthwatch and the satisfaction of basic human needs. ^{10/}

21. At the same session, the Governing Council decided that the International Register of Potentially Toxic Chemicals (IRPTC) should form part of Earthwatch ^{11/} and agreed that its establishment as a programme activity centre should be a concentration area. ^{12/}

22. Also at its fourth session, the Governing Council took a number of other decisions about the future direction of work in various parts of Earthwatch; reference will be made to these at appropriate places below.

2. The components of the assessment process

(a) Monitoring: The Global Environmental Monitoring System (GEMS)

(i) Introduction

23. Monitoring is defined here as a process by which selected environmental variables are systematically observed, measured and interpreted for defined purposes; this definition excludes research, which is a separate function under Earthwatch, although monitoring and research must be closely linked. GEMS is a co-ordinated effort by the world community to monitor global and regional data needed for the rational management of the environment. The programme activity centre for GEMS co-ordinates this effort.

(ii) Objectives and strategies

24. The objectives of GEMS were endorsed at the third session of the Governing Council ^{13/} and have been summarized elsewhere. ^{14/} Although no strategies as such have been defined, the evolution of GEMS has been guided by the work of the 1971 Intergovernmental Working Group on Monitoring and the 1974 Intergovernmental Meeting on Monitoring and by a number of Governing Council decisions. Both intergovernmental meetings recommended that global monitoring should be built "to the maximum extent possible" on existing national and international monitoring activities and should use, "to the maximum extent possible", the institutional basis provided by the United Nations system, and both meetings insisted that scientific analysis and interpretation of data should be incorporated in the design of monitoring.

25. The 1974 Intergovernmental Meeting identified seven programme goals for GEMS and a tentative list of priority pollutants. At its third session, the Governing Council endorsed these and requested the Executive Director of UNEP to accelerate the development of GEMS "by convening small groups of governmental experts to work in close harmony with the relevant United Nations bodies in designing and implementing the first stage of the Global Environmental Monitoring System". ^{15/} The importance of GEMS was emphasized again by the Council's decision (see paragraph 20 above) to identify the implementation of the system as a concentration area.

^{9/} This element was included under Earthwatch by decision 50 (IV), para. 4.

^{10/} UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

^{11/} Decision 50 (IV), para. 8.

^{12/} UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

^{13/} Decision 29 (III), para. 1.

^{14/} UNEP/GC/INFORMATION/1, sect. II.A.1 (a) (i).

^{15/} Decision 29 (III), para. 9 (i).

(iii) Goals and related activities

26. The following are the goals as listed by the 1974 Intergovernmental Meeting (the order of listing was not then, and is not now, intended to indicate any order of priority):

Goal A - Expanded warning system of threats to human health (paragraphs 45-49 below)

Goal B - Assessment of global atmospheric pollution and its impact on climate (paragraphs 45-54 below)

Goal C - Assessment of extent and distribution of contaminants in biological systems, particularly food chains (paragraphs 48-49 below)

Goal D - Assessment of critical problems arising from agricultural and land use practices (paragraphs 35-42 below)

Goal E - Assessment of the response of terrestrial ecosystems to environmental stress (paragraphs 35-42 below)

Goal F - Assessment of the state of ocean pollution and its impact on marine ecosystems (paragraphs 43-44 below)

Goal G - An improved system of international disaster warning (paragraph 55 below).

27. At its fourth session, the Governing Council requested the Executive Director to:

"develop for presentation to the Governing Council at its fifth session an over-all plan for the Global Environmental Monitoring System which discusses:

"(i) How the seven goals of the System will be integrated with one another, and the short-range and long-range implementation plans for each goal area;

"(ii) The priority variables to be the subject of global monitoring within each goal area;

"(iii) The flow of data from collection to final assessment." 16/

A detailed report in response to the above request is available in UNEP/GC/INFORMATION/5, and a brief summary of this information follows.

(iv) Integration of goals and implementation plans

28. Two characteristics throw light on how the seven goals relate to one another:

(a) Goals E and F are very broad, and between them largely subsume the remaining goals. For example, evidence of "environmental stress" of terrestrial ecosystems (Goal E) can be seen in the impact of pollutants on climate (Goal B) and contaminants in biological systems (Goal C), in man's misuse of natural resources (Goal D), in environmentally-induced disease (Goal A), and in some of the factors contributing towards natural disasters on land (Goal G);

(b) The goals can be grouped into two broad categories with different kinds of output data: those relating to monitoring the actual and potential degradation of various natural resources (E, D and part of F) and those related to pollution monitoring (A, B, C and part of F). Depending upon the type of natural disaster, Goal G could fall into either category (or neither). Within each category, it is essential to design monitoring systems which will allow the output from activities under one goal to be analysed alongside the output from activities under other related goals, thereby obtaining maximum use from the data.

16/ Decision 63 (IV), sub-para. (c).

29. The ultimate aims of global and regional pollution monitoring are:

- (a) The determination of the levels of selected critical pollutants in particular media, their gradients in space and their trends in time;
- (b) An understanding of the magnitude and rates of the mass flow of selected pollutants, and of their harmful transformation products;
- (c) The provision of an opportunity for countries, including developing countries, to compare methods of sampling and analysis, in order to obtain comparable results and to exchange experience on monitoring systems;
- (d) The provision, on a global or regional scale, of information essential for management decisions on pollution control.

30. It is more difficult to determine how to integrate the output of monitoring renewable natural resources. GEMS has approached this problem through the initiation of pilot studies to develop methodologies and make large-area, small-scale global and regional surveys of natural resources (soil, forest and rangeland). These surveys will serve to define critical areas of degradation, which may then be studied by more intensive monitoring to yield data on which Governments may wish to base corrective action.

(v) The priority variables

31. A list of priority pollutants and "other related environmental factors" was produced by the 1974 Intergovernmental Meeting. ^{17/} This list has been followed wherever possible, with due regard to expert recommendations on the development of individual monitoring activities. The pollutants and other variables which are monitored are mentioned below under activities relevant to the goals.

32. In some cases, pilot activities have been set up to determine the priority variables to be measured and the best way of doing this. For example, the pilot activities on forests and rangelands have a large methodological and logistic component and those on open ocean monitoring are designed to develop reliable methodologies for measuring small amounts of heavy metals and organochlorines in open ocean waters.

(vi) The flow of data from collection to final assessment

33. The raw data from each monitoring activity are collected and subjected to analysis and quality control procedures as an integral part of the activity. Once the data are thus validated (see paragraph 105 (a)), they are published by the co-operating agency and made widely available to Governments, the international scientific community and international organizations; where appropriate, this information is subjected to scientific interpretation by the international community. As significant amounts of data become available in this way, perhaps by 1979, it is intended to convene Government expert groups to examine the information, and available scientific interpretations of it, from sets of related monitoring activities. The conclusions of these groups will be widely published and made available to all Governments by UNEP in collaboration with the agencies concerned.

(vii) Activities under the goals

34. For convenience, the seven goals are grouped under three headings (see paragraph 28 (b)): ^{18/}

- Resource monitoring (E, D and part of F)
- Pollution monitoring (A, B, C and part of F)
- Natural disaster monitoring (G).

^{17/} See document UNEP/GC/24.

^{18/} For a fuller account of progress under GEMS, see UNEP/GC/INFORMATION/5.

35. Resource monitoring - The Government Expert Meeting on Soil and Vegetation Cover Monitoring (March 1976) 19/ recommended co-ordinated pilot studies on the monitoring of tropical forests, tropical rangelands and their soils (Goals D and E). Two pilot studies, dealing with forests and rangelands, are being developed with the co-operation of the Food and Agriculture Organization of the United Nations (FAO). The studies will concentrate initially on four contiguous West African countries, making broad surveys of their vegetation cover in a continuous transect from the tropical forest to the desert edge.
36. Though the surveys will enable critical areas to be identified by Governments, their main concern is the development and refinement of monitoring methodologies and vegetation classifications. The methodologies will be developed on the basis of a qualitative and quantitative assessment of past changes in vegetation cover and will consider using a combination of ground surveys and remote sensing data (mainly aerial photography and Landsat satellite multispectral imagery). The classification studies, which take into account work already done by the United Nations Educational, Scientific and Cultural Organization (UNESCO), are aimed at developing consistent vegetation classifications for both forest and rangeland, adaptable throughout the tropics.
37. Preparation for the pilot forest monitoring activities began at the end of 1975; implementation began a year later 20/ and by the end of 1977 the first forest cover data should be available for the four initial countries. Results of the pilot monitoring of a rangeland area 21/ between the tropical forest and the desert are expected to be available two years later, since that activity will not start until late 1977.
38. From 1978 onwards, the monitoring methodologies and vegetation classification schemes used in the two pilot studies should be sufficiently refined to be capable of use, with modifications, in other tropical areas. Provided that the necessary inputs are available, a complete survey of vegetation cover should be available for most of the tropical belt by 1985; this will permit identification of the critical areas needing more intensive monitoring or remedial action to check the rate of degradation. FAO, UNESCO and the World Meteorological Organization (WMO) are among the United Nations bodies likely to be involved, as well as the International Council of Scientific Unions (ICSU) and its specialized committees.
39. Forest and rangeland monitoring will provide information on land use in the areas covered. On a broader scale, FAO has initiated a global appraisal of land suitability by agro-ecological zones (1976-1978), which will make it possible to assess the world's potentially arable land.
40. In response to Recommendation 20 of the Stockholm Conference, work on the global assessment of soil degradation and degradation hazards began in June 1975. A draft map of soil degradation (1:5,000,000) is expected to be available in December 1977 for Africa north of the Equator; the data upon which that map will be based have also been used in the production of a map of desertification for the United Nations Conference on Desertification. By the end of 1978, the assessment of soil degradation and degradation hazards for Africa north of the Equator and the Middle East will have been completed; the global assessment is expected a year later.
41. During 1977, the soil degradation project 22/ will have made possible the identification of critical areas in the tropical zone of North Africa which require more intensive monitoring, especially of salinization and alkalization.
42. Within the framework of UNESCO's Man and the Biosphere Programme (MAB) a number of natural and man-influenced areas have been declared as biosphere reserves. UNEP is considering the possibility of using them for monitoring degradation processes and selected pollutants in air, soil and water.

19/ FP/1301-75-04/Global/FAO/18,735/16,235/X'75-IV'76/GC/96.

20/ FP/1102-75-05/Global/FAO/1,087,850/586,850/IX'75-III'78/GC/96.

21/ Ibid.

22/ FP/1106-75-05/Global/FAO/1,005,300/541,500/VI'75-V'78/GC/96.

43. Pollution monitoring - Though data on the quality of the oceans have been collected for many years (e.g. by ICES), little is known about background levels of such pollutants as heavy metals and organochlorines in open ocean waters (Goal F). To consider this problem, UNEP, with the Intergovernmental Oceanographic Commission (IOC) and WMO, organized a joint IOC-WMO/IPLAN and UNEP Government Experts Meeting in March 1976 on "The Monitoring of Background Levels of Selected Pollutants in Open Ocean Waters". 23/ Experience gained in the Integrated Global Oceans Station System (IGOSS) Pilot Project on Marine Pollution Monitoring (Oil), which it is planned to continue through a second phase, has shown the need for well-planned pilot studies before developing large programmes, and the group of experts recommended a pilot phase to intercalibrate methods and initiate monitoring in the waters of the Atlantic Ocean (1977-1980). The experience from the pilot activity will provide the methodologies to monitor other oceans in response to the Governing Council's request at its third session. 24/ Pollution monitoring at river mouths as a means of determining the river-borne inputs to oceans is also being considered in the context of the Register of Rivers Discharging into the Oceans that UNESCO is establishing in co-operation with UNEP (see paragraph 473 (d) below).

44. The Mediterranean pollution monitoring and research programme (see paragraph 494 below) monitors heavy metals and organochlorines in certain marine organisms as well as in open ocean waters, and relates these measurements to research on the effects of pollutants in marine ecosystems. Action plans for other regional seas, e.g. the Red Sea and the Caribbean, will also contain monitoring components, and monitoring activities may also be initiated in 1978 in the Indian Ocean.

45. Under health-related monitoring (Goals A, part of B and C), the main activities concern air pollution at impact stations, 25/ food contamination 26/ and water quality. 27/ Monitoring of atmospheric SO₂ and particulates in urban areas has been undertaken by the World Health Organization (WHO) since 1973 at forty-two sampling stations in fourteen developed countries. During the next two to three years, the number of stations will be expanded to 150 in 50 different countries, including 20 stations in cities with air pollution problems in developing countries. After 1978, it is planned to monitor additional pollutants such as NO_x and carbon monoxide. The results for 1973 and 1974 have been published; the data for 1975 will be published by mid-1977; and for 1976 by the end of 1977. These activities are being co-ordinated with similar activities carried out by the Pan-American Health Organization (PAHO) in the western hemisphere, and it is expected that the Indian National Environmental Engineering Research Institute will make a major contribution to them in the Economic and Social Commission for Asia and the Pacific (ESCAP) region in co-operation with UNEP and WHO.

46. While these activities aim at ensuring that comparable data of primarily local significance are obtained in different countries, they do not provide information on the amounts of pollution that may be transported over large distances from urban or industrial centres. The need to develop a programme to monitor and evaluate long-range transport of air pollutants (especially SO₂) in Europe was given special emphasis in the Final Act of the Conference on Security and Co-operation in Europe. At its fourth session, the Governing Council requested 28/ that UNEP co-operate in the development of such a programme. Accordingly, a plan involving UNEP, the Economic Commission for Europe (ECE) and WMO, and which takes advantage of the experience gained during a former research project of the Organization for Economic Co-operation and Development (OECD), is being drawn up for approval by the participating Governments for implementation in 1977. The data resulting from this activity will have a bearing on a number of environmental problems in addition to those related to health.

23/ FP/0503-76-01/Med/ECE/419,000/310,000/VIII'76-XI'77/GC/96.

24/ Decision 32 (III).

25/ FP/1301-75-03/Global/WHO/794,000/444,000/XI'75-X'78/GC/96.

26/ FP/1301-76-03/Global/FAO/606,900/485,500/II'76-I'79/GC/96.

27/ FP/1301-76-05/Global/WHO/1,075,000/640,000/X'76-VII'79/GC/96.

28/ Decision 64 (IV).

47. The United Nations Scientific Committee on the Effects of Atomic Radiation is continuing to assess the levels, effects and risks of ionizing radiation using monitoring data and other information. The Committee will report comprehensively to the General Assembly at its thirty-second session (see paragraph 219 below).

48. UNEP/WHO/UNESCO/WMO water quality monitoring activities, and the UNEP/FAO/WHO scheme for monitoring contaminants in food intended for human and animal consumption, are at an early stage of development but will become operational in 1977. The impact monitoring of pesticides and pesticide residues in terrestrial living resources, in humans and in human milk is under consideration by UNEP in co-operation with FAO and WHO. The possibility of linking such studies with others, such as monitoring pesticide residues in wildlife as currently carried out by OECD, is under consideration.

49. Government experts on health-related monitoring will meet in April 1977 ^{29/} to review the foregoing and other activities with a view to supplementing them by monitoring specifically aimed at the assessment of human exposure to pollutants, as determined by intakes, body burdens or excretion.

50. Climate-related atmospheric monitoring activities (part of Goal B) are undertaken by UNEP and WMO, largely within the latter's World Weather Watch (WWW) programme. Data are collected on CO₂, atmospheric turbidity and precipitation chemistry from baseline and regional stations. The UNEP/WMO feasibility study for a baseline station on Mount Kenya ^{30/} is now well under way; if the study proves positive, the station could become operational in 1979. The possibility of collecting data on certain biological and ecological indicators at this and other stations will then be considered in some detail. The total number of established and planned baseline stations is fourteen in nine countries; ten stations are at least partly operational (see map 1 for distribution). The number of regional stations established or planned is about 120 in 59 countries; over half are at least partly operational. Since the UNEP/WMO action ^{31/} was launched in 1974, 12 regional stations in 10 countries have been established (see map) and five will shortly come into operation.

51. Some baseline and regional stations may soon be monitoring additional rare atmospheric constituents, such as ozone, halocarbons and possibly NO_x and NH₃; indeed three baseline stations have already begun to do so. The UNEP ozone meeting (see paragraphs 140-142 below) will no doubt stress the need to increase ozone monitoring and that of NO_x, halocarbons and other chemicals which may affect stratospheric ozone. Further suggestions will undoubtedly also arise from the planned UNEP/WMO-sponsored Government Expert Group on Climate-Related Monitoring, to be held between the fifth and sixth sessions of the Governing Council. The feasibility of undertaking multipurpose monitoring at some baseline and regional stations is being studied (paragraph 56).

52. Arrangements have been made by WMO with the United States of America to publish data from the network of regional stations; so far publications include data for 1972, 1973 and 1974. Carbon-dioxide data from all the operational baseline stations will be published with the 1975 regional data. Other data from baseline stations are being published by the country in which the station is located.

53. The Global Observing System of the WWW programme provides real-time data on global weather conditions. Collecting systems include polar orbiting and geostationary satellites, aircraft, ships and terrestrial stations. Part of the WWW network was used in the Atlantic Tropical Experiment of the Global Atmospheric Research Programme (GARP) and the whole network will be used in the WMO/ICSU First GARP Global Experiment (FGGE) (1978-1979). ^{32/}

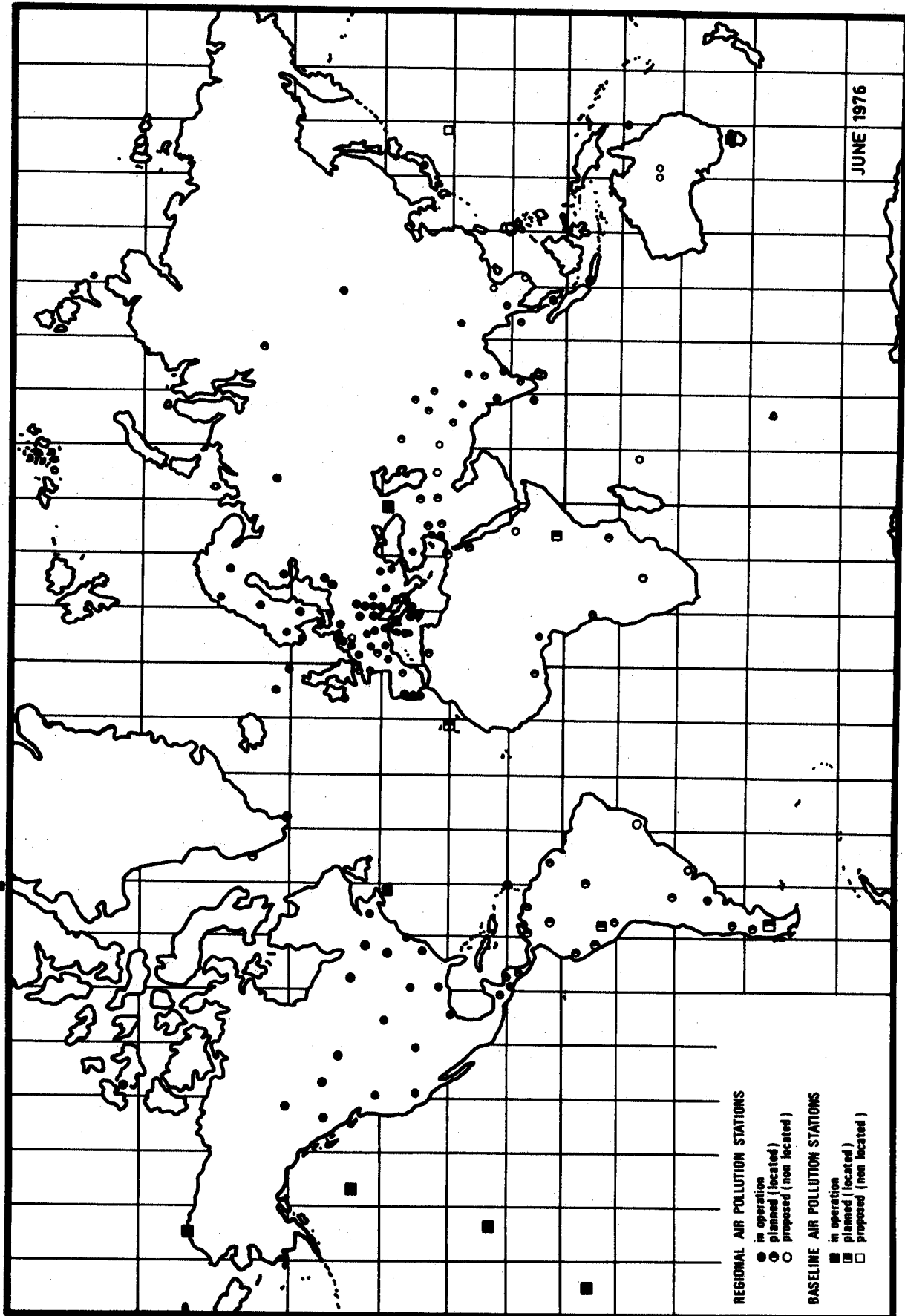
^{29/} FP/1301-76-06/Global/WHO/70,000/65,000/1'77-1V'77/GC/96.

^{30/} FP/1301-76-04/Africa/WMO/291,800/245,300/VI'76-X'77/GC/96.

^{31/} FP/0800-74-06/Global/WMO/1,200,000/585,000/X'74-X'78/GC/96.

^{32/} FP/1301-77-01/Global/WMO/100,000,000/1,070,000/1'77-XI'80/GC/96.

MAP 1
PRESENT STAGE OF WMO NETWORK FOR MONITORING BACKGROUND AIR POLLUTION



54. FGGE will provide for the first time a comprehensive set of global observations of physical interactions between the atmosphere and the ocean, an understanding of which is needed to appreciate the effects of pollutants on climate. Among the observational systems used in FGGE, in addition to WWW, will be five geostationary meteorological satellites, four polar orbiting satellites, a number of research satellites, long-range reconnaissance aircraft, and the regional and baseline atmospheric monitoring stations. UNEP co-operates in FGGE by meeting the cost of ship-borne upper air equipment.

55. Natural disaster monitoring (Goal G) - The IOC tsunami warning system is in operation and the WMO Tropical Cyclone Project will help improve warning systems in areas affected by tropical cyclones and their associated floods and storm surges. Earthquake reporting is established on a global basis, and recent scientific advances may soon make possible the development of operational regional earthquake warning systems. Regional networks for flood warnings exist in a number of river basins. Landslides are one of the few types of natural disaster for which there has been little effort made to develop a global or regional warning system, and the GEMS programme activity centre, in co-operation with the Office of the United Nations Disaster Relief Co-ordinator (UNDRO) and other organizations concerned, will be looking into the possibility of using LANDSAT or LANDSAT-type satellites to monitor phenomena that might make it possible to predict some of the larger landslides. A satellite-receiving station exists in South America, a region where landslides are an important cause of loss of life (see also paragraphs 551-557).

(viii) Research, development and training

56. With the Scientific Committee on Problems of the Environment (SCOPE) of ICSU and the Rockefeller Foundation, UNEP supports the Monitoring and Assessment Research Centre (MARC) ^{33/} at Chelsea College in London. MARC is undertaking a feasibility study of multi-purpose monitoring, i.e. the monitoring of air, water, organisms, etc., by one station, rather than by separate monitoring networks for each activity, as is usually done. MARC is also concerned with the training aspects of monitoring and evaluation and will develop a number of courses in co-operation with UNESCO, concentrating on the needs of developing country personnel; this activity supplements training which is provided as an integral component of all GEMS activities in which UNEP is involved.

(ix) Proposed Fund programme activities

57. The Executive Director intends to support the following actions from the Fund of UNEP:

	<u>Paragraphs</u>
(a) Rangeland monitoring	35-39
(b) Tropical forest cover monitoring, phase II	38
(c) Soil alkalization and salinization monitoring	41
(d) Monitoring in biosphere reserves	42
(e) Background pollution monitoring in open ocean waters	43
(f) IGOSS pilot project on marine pollution, phase II	43
(g) World Register of Rivers Discharging to the Oceans, phase II	43
(h) Monitoring in the Indian Ocean	44
(i) Air and water monitoring in the ESCAP region	45
(j) Long-range transport of air pollutants in Europe	46
(k) Impact monitoring of pesticide residues	48

^{33/} FP/0800-74-03/Global/SCOPE/I, 129, 700/512, 800/IX'74-III'77/GC/96.

Paragraphs

(l) Monitoring of pesticide residues in human milk	48
(m) Monitoring of human exposure to pollutants	49
(n) Expansion of climate-related monitoring activities	51
(o) Government expert group on climate-related monitoring	51
(p) First GARP global experiment	53-54
(q) Natural disasters monitoring	55

(b) Research

(l) Introduction and background

58. The Governing Council, at its fourth session, requested the Executive Director:

"To urge the Environment Co-ordination Board to establish as soon as possible sub-groups on Earthwatch-related research and evaluation in its working group on Earthwatch". 34/

59. The Board received the advice of its Working Group on Earthwatch on this matter at its sixth session and, noting the view of the group that the proliferation of meetings and groups added substantially to the workload of the agencies, decided 35/ to establish a single sub-group on research and evaluation, which would advise the Board on needs and priorities for:

(a) Research aimed at improving the techniques used in monitoring, evaluation, and other components of Earthwatch;

(b) Research aimed at improving understanding of the physical and biological mechanisms underlying various environmental processes and changes and at providing the knowledge needed to interpret the results of monitoring and to improve the efficacy of monitoring itself;

(c) The evaluation mechanisms, procedures and specific steps required to assess the state of the environment and the changes taking place in it.

60. Also at its fourth session, the Governing Council requested the Executive Director "to develop and initiate the implementation of an integrated evaluation programme and interdisciplinary research programme as interacting component parts of Earthwatch, ... and to report on progress in this respect to the Governing Council at its fifth session". 36/

61. The implications of this decision were carefully reviewed by the Earthwatch Working Group of the Board in September 1976, and the following account of the characteristics of Earthwatch-related research is based upon the group's perception of the subject.

62. Unlike monitoring and information exchange, research and evaluation are not self-contained activities. They permeate the other functions of Earthwatch; for example, research on observational techniques in monitoring cannot be separated from monitoring itself. Earthwatch-related research can be broadly divided into two classes: research to improve the techniques used in monitoring and evaluation, and research to improve the understanding of the mechanisms of various environmental processes and hence provide the knowledge needed to interpret the results of monitoring.

34/ Decision 63 (IV), sub-para. (a).

35/ UNEP/GC/89, para. 23.

36/ Decision 63 (IV), sub-para. (b).

63. An immense amount of such research is carried out currently by individual institutions. Other Earthwatch-related research activities are organized at the multinational level and are co-ordinated by international organizations within and outside the United Nations system, an example being GARP, organized and co-ordinated by WMO and ICSU.

64. Other examples where UNEP may or will be involved are the Programme on Long Range Transport of Air Pollutants over Europe, which may be launched by ECE, WMO and UNEP in 1977 (see paragraph 46), and the ozone research programme, in which a number of organizations, including UNEP, will be involved following the ozone meeting in Washington in March 1977 (paragraphs 140-142).

(ii) Activities

65. The activities are:

Activity A (1976-1977) - Compilation of a consolidated list of on-going and planned Earthwatch-related research (paragraph 66).

Activity B (1978) - Identification of gaps in such research (paragraph 67).

Activity C (from 1978) - Development and initiation of an interdisciplinary research programme (paragraph 68).

66. Activity A - UNEP will produce a draft list of on-going and planned Earthwatch-related research in the United Nations system for consideration by the Environment Co-ordination Board's sub-group on research and evaluation. The sub-group will compile a consolidated list of all relevant research, which should be available during 1977/1978.

67. Activity B - A meeting of consultants will identify the gaps in research; their report should be ready by the time of the sixth session of the Governing Council.

68. Activity C - Thereafter, steps will be taken to fill the gaps and to develop and initiate an interdisciplinary research programme.

69. As indicated in paragraph 62, the research programme will be carried out under the Earthwatch component parts. It is therefore not proposed to create a separate budget line to finance such activities.

(c) Information exchange: the International Referral System for sources of environmental information (IRS) and the International Register of Potentially Toxic Chemicals (IRPTC)

(i) Introduction

70. Rational management of the environment depends upon the availability of information on scientific, technical, economic, social and other factors. Much of this already exists and additional information is being generated all the time. UNEP's information exchange activities are designed to facilitate the delivery of this information to those who need it. This responsibility has been assigned to programme activity centres for IRS and IRPTC, both of which have been identified as concentration areas by the Governing Council (paragraphs 21 and 22).

(ii) IRS: Objectives and strategies

71. The objectives and strategies for IRS were endorsed by the Governing Council at its third session ^{37/} and have been summarized elsewhere. ^{38/} On the basis of the operational experience gained since, and following a review of the relevance of the approved objectives

^{37/} Decision 29 (III).

^{38/} UNEP/GC/INFORMATION/I, sect. II.A.1 (b) (i) and (ii).

and strategies, the Executive Director proposes that these be reformulated as follows:

Objectives:

To promote and catalyse the improved availability of relevant environmental information for decision-makers, planners and others requiring it; to demonstrate the use of this information as an important tool in making better decisions relating to environmental assessment and management; to assist UNEP in gaining access to environmental information in support of its activities; and to contribute to the flow of such information from source to user within individual countries by assisting IRS national focal points in setting up national components of IRS, and internationally by the establishment and operation of appropriate intergovernmental mechanisms, principally by a global referral network;

Strategies:

- (a) Establishment of an effective institutional framework and provision of facilities for information exchange on environmental matters;
- (b) Promotion of programmes to catalyse national and regional information and communication links for the exchange and use of environmental information;
- (c) Use of existing or planned sources of information and of established information systems to the maximum extent possible; and promotion of greater compatibility between information systems, within the principles of UNISIST;
- (d) Setting up and operating a decentralized, global information network, involving active participation by Governments, agencies and others, and based on referral, for identifying sources of environmental information;
- (e) Publication of a regularly updated directory of these sources, searchable by computer or manually, giving relevant information on their capabilities in the field of environment;
- (f) Promotion of a co-ordinated effort by agencies and intergovernmental and non-governmental organizations covering the field of environmental information; and conduct of joint programming on environmental information activities with agencies;
- (g) Provision of technical assistance, particularly to improve the capability of developing nations to produce and use information; providing encouragement to programmes of bilateral assistance and technical co-operation between countries;
- (h) Establishing links with all components of UNEP and providing referral services for them.

(iii) IRS: Activities 39/

72. The activities of IRS, all of which fall within an approved area of concentration, are:

Activity A - Development of the IRS network, particularly through assistance to Governments, agencies and others to encourage their active participation in the system (paragraphs 73-78).

Activity B - Consolidation of the system, through building an awareness of the service it offers, encouraging its use and helping to develop the source and user communities (paragraphs 79-80).

Activity C - Compilation and regular updating of the directory of sources of environmental information and development of the backup systems to ensure its maximum use (paragraphs 81-84).

39/ Most IRS activities are conducted under Project FP/1302-74-03/Global/Internal/1,801,685/1,801,685/VI'75-XII'77/GC/96.

Activity D (1977) - Improvement of communication links between the various components of IRS, and in particular between the IRS programme activity centre and its computer facilities (paragraph 85).

Activity E (1977) - Review, evaluation and reporting on the effectiveness of IRS, and formulation of proposals for its further improvement (paragraph 86).

Activity F (1977-1978) - Development of operational links with other information systems (paragraphs 87-90).

73. Activity A - The successful operation of IRS depends in large measure on the response of Governments and other partners. However, although some 60 Governments had registered as partners by the time of the fourth session of the Governing Council, fewer than 300 sources of information had been received from them by UNEP/IRS. Therefore, the Council requested Governments "to accelerate their activities in relation to the International Referral System and in particular to submit sources of environmental information to the United Nations Environment Programme as soon as possible". ^{40/} Another decision of the Council invited Governments to respond promptly and fully to requests of the Executive Director with respect to sources of information for IRS. ^{41/} Even so, participation by countries is still not adequate for fully effective operation of the system; several initiatives have been taken to improve the involvement of partners, such as training workshops, seminars, consultant and staff visits, bulletins, informal reports and training programmes.

74. During 1977, the major effort will continue to be to:

- (a) Activate national focal points and agency points of contact;
- (b) Bring non-partner countries and agencies into the system;
- (c) Develop and stimulate the use of IRS.

75. National participation has been promoted by visits by IRS staff and consultants and by training workshops. Six workshops have been held, one in each region of the world; 154 countries were invited and 57 partner countries, 14 non-partner and 14 international or regional organizations attended. The details of participation are shown in table I.

76. Study tours have been provided to enable focal points in Ghana, Jamaica and Israel to visit the United States in October 1976 for training in the conduct of IRS work in their own countries. Expanded efforts for training IRS personnel in national focal points are planned for 1977, including the development, with the co-operation of Governments, of pilot focal points to provide training to personnel from other countries.

77. As a result of these and other efforts, the number of national focal points has risen since the fourth session of the Governing Council from 60 to 70 (for geographical distribution, see map II). During the same period, the number of source registrations received from national focal points has risen from 298 to approximately 1,100; seventeen Governments have provided these sources (see also paragraph 81). In view of the slow response of Governments, UNEP/IRS is also exploring other methods for building up the system. With the co-operation of the Non-Governmental Environment Liaison Centre, several hundred non-governmental sources have been received, which could bring the number of sources to over 2,000, provided the Governments concerned agree to their inclusion.

78. At its sixth session ^{42/} the Environment Co-ordination Board, in responding to the recommendation of its Earthwatch Working Group, invited agencies to take an active part in IRS by establishing points of contact, if they had not already done this. UNEP participation in United Nations inter-agency efforts such as the Inter-Agency Task Force on Data

^{40/} Decision 63 (IV), para. (d).

^{41/} Decision 47 (IV), sect. I, para. II.

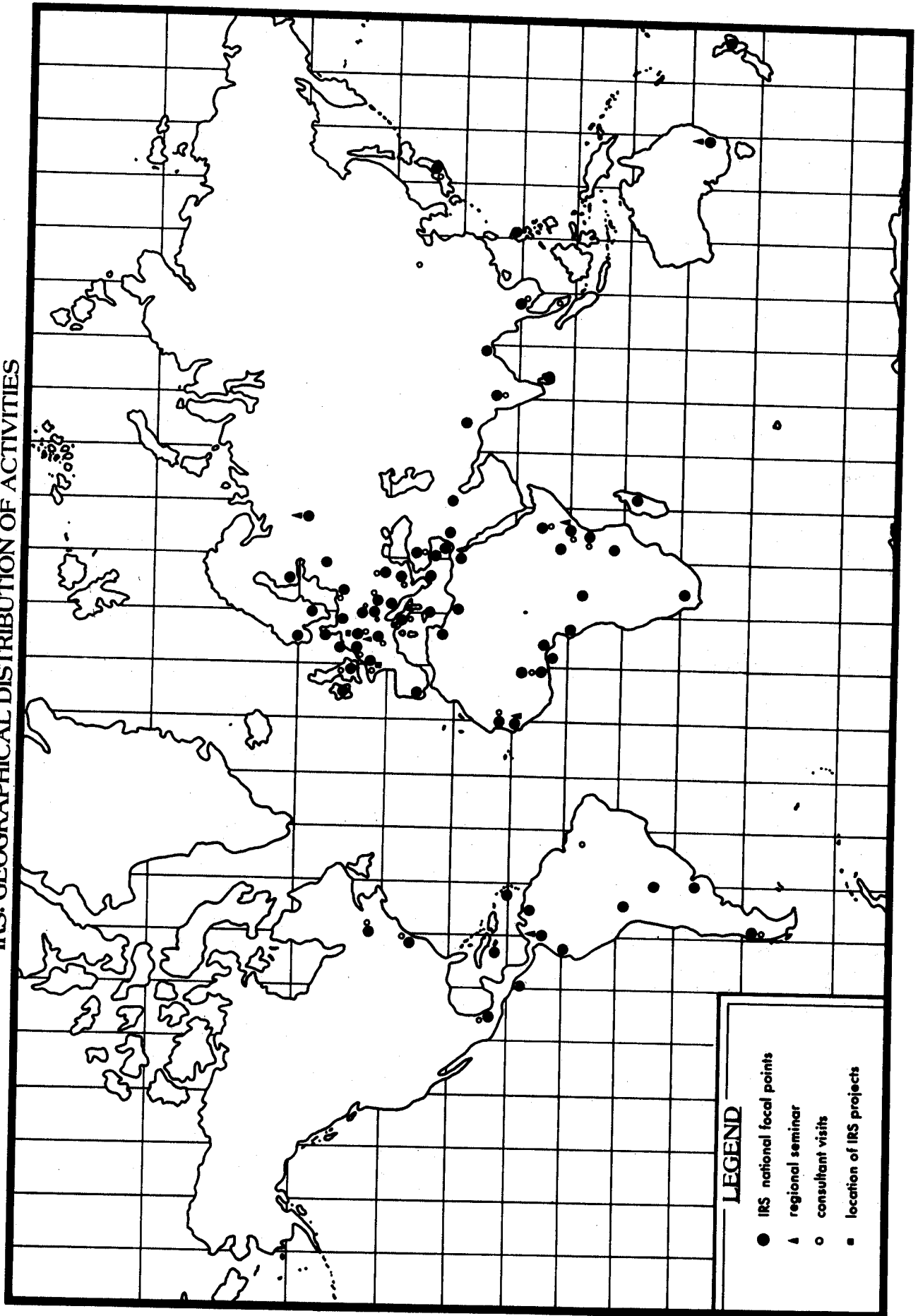
^{42/} See also UNEP/GC/89, para. 28.

Table 1

ANALYSIS OF IRS WORKSHOP/SEMINAR ATTENDANCE

TITLE OF MEETING	INVITED			ATTENDED			TOTAL PARTICIPANTS
	PARTNERS	NON-PARTNERS	ORGANIZATIONS	PARTNERS	NON-PARTNERS	ORGANIZATIONS	
First IRS Regional Seminar for English-speaking Africa and West Asia, Nairobi, 29 September - 3 October 1975	8	24	6	6	1	1	14
Second IRS Regional Workshop for Western Europe and North America Geneva, 27-31 October 1975	20	8	4	18	3	3	30
Third IRS Regional Seminar for French-speaking Africa Dakar, 1-5 March 1976	8	19	2	5	2	2	24
Fourth IRS Regional Workshop for OMEA countries and Yugoslavia Moscow, 28 June - 2 July 1976	10	3	3	9	1	3	31
Fifth IRS Regional Workshop for Asia and the Pacific Region Sydney, 9-13 August 1976	9	19	3	8	2	1	21
Sixth IRS Regional Workshop for Latin America and the Caribbean Region, Bogota, 15-19 November 1976	11	15	15	11	4	4	41

MAP II
IRS: GEOGRAPHICAL DISTRIBUTION OF ACTIVITIES



(paragraph 165) and the Inter-Agency Task Force on Information Exchange and the Transfer of Technology will continue to take account of IRS interests.

79. Activity B - Efforts are under way to develop materials, brochures, audio-visual presentations, technical and non-technical literature, etc., so as to bring to the attention of decision-makers, focal points, users and sources the advantages of participation in IRS.

80. The following technical publications have been issued:

- IRS Operational Manual: first and second editions
- IRS Informal Reports: 76-1 to 76-5
- IRS Bulletins: 76-1 to 76-3
- IRS International Directory and Index: Quarterly since 1 January 1977

81. Activity C - The first edition of the Directory, containing over 1,300 sources from 12 countries, has been published. It is available to focal points in printed form or on computer-searchable magnetic tape, together with search software allowing its use on most computer systems; it will be up-dated four times a year. The printed version will be issued with a cumulative index to facilitate its use, particularly for manual searching.

82. While the task of searching the Directory in response to any environmental enquiry will rest with the respective focal point, the IRS programme activity centre is also available to assist users during the early stages of system development.

83. During 1976, pending the completion of the Directory, IRS made available the services of an informal "interim mode" operation to locate sources of information in response to requests. The number of requests received by December 1976 was 100 from 14 countries. These requests were forwarded to about ten IRS partners who were expected to have relevant information; 465 responses (44 per cent), of which 376 were positive, were received. Follow-up questionnaires have been sent to users. With the issue of the IRS Directory, and the introduction of systematic search capabilities, the "interim mode" of operations has been terminated.

84. Efforts continue towards development of "dictionary" definitions of the IRS attribute terms used for storage and retrieval. 1977 activities in this area are expected to focus on joint efforts between UNEP/IRS and, among others, the Union of Soviet Socialist Republics, the United States of America, UNISIST and the Commission of the European Communities, all of whom have indicated an interest in working with IRS in this area. Ways are being examined of promoting greater comparability between IRS attributes and the sectoral thesauri of agencies, other intergovernmental bodies dealing with environmental information and the inter-agency task forces noted in paragraph 78 above.

85. Activity D - A fully operational communication link between the IRS programme activity centre and its computer facilities is near completion. With the link established, IRS expects to acquire the capability to respond promptly, accurately and fully to requests for sources of environmental information. The communications needs between sources, users, and their focal points, as well as between individual focal points, are being studied.

86. Activity E - During 1977, a major review and evaluation will be undertaken of the IRS system design, operations and network development activities. Following consultations with Governments, the review will be the basis for recommendations to the Governing Council at its sixth session on the further development of IRS.

87. Activity F - Several information systems exist, within the United Nations system and elsewhere, on subjects related to the environment programme; these are described below. IRS is establishing appropriate links with them, principally through the Environment Co-ordination Board.

88. The principles underlying UNESCO's UNISIST have been followed in the development of IRS. UNESCO also sponsors the directory of experts on environmental education, the entries in which will be included in IRS as sources. UNESCO and IOC support the Marine Environmental Data and Information System (MEDIS) 43/ which co-operates closely with IRS; the possibility of incorporating this system within the IRS network as a sectoral focal point is under consideration.

89. Several information systems within FAO are relevant to environmental information, including the bibliographic systems (e.g. the Agricultural Research Information System and inventories). IRS supports the Catalogue of Legislation on Environment and Natural Resources in the Legal Office of FAO 44/ and its Aquatic Sciences and Fisheries Information System. 45/

90. Other information systems or activities of relevance to IRS include:

- (a) Technical Information System of UNIDO;
- (b) The International Occupational Safety and Health Information Centre and the ISIS system of ILO;
- (c) The International Nuclear Information System of IAEA;
- (d) UNDRO's activities in disseminating information on natural disasters;
- (e) WHO's sources of information;
- (f) The recent work of UNDP and others in establishing development related information systems, including the Information Referral System for Technical Co-operation among Developing Countries under implementation by UNDP, and the DEVSIS information system which is currently being developed;
- (g) Work relating to the technical development of information handling in the field of environment carried out by the International Federation of Documentation;
- (h) A project with the International Union for Conservation of Nature and Natural Resources (IUCN) and Environmental Law Information System, which is supported by IRS, to provide information on environmental legislation.

(iv) IRS: Proposed Fund programme activities

91. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) IRS programme activity centre:
 - (i) Training programme (paragraphs 75-76);
 - (ii) Publicity materials (paragraph 79);
 - (iii) Technical publications (paragraph 80);
 - (iv) Data processing and communication (paragraphs 81 and 85);
 - (v) Intergovernmental review and evaluation of IRS (paragraph 86);
- (b) Other actions:
 - (i) Financial support to other systems (paragraphs 78, 87-90);
 - (ii) Projects for systems development (paragraph 84).

43/ FP/0900-74-04/Global/UNESCO/209,000/134,230/V'74-XII'78/GC/96.

44/ FP/1302-75-02/Global/FAO/75,048/26,304/IX'76-X'77/GC/61 and 96.

45/ FP/1302-75-01/Global/FAO/802,500/248,000/VII'76-VI'78/GC/61 and 96.

(v) IRPTC: Objectives and strategies

92. The direction of work was approved at the third session of the Governing Council, 46/ and presented as a summarized strategy at the fourth session; 47/ this has been set out elsewhere. 48/

(vi) IRPTC: Activities

93. The activities are:

Activities within the concentration area

Activity A - Continued development of the IRPTC programme activity centre (paragraphs 94-95).

Activity B (1976-1978) - Development of the network of national correspondents and partner institutions and of the data bank (paragraphs 96-98).

Other activities

Activity C (1976-1978) - The development of an early warning capability (paragraph 99).

Activity D - Publications programme (paragraph 100).

94. Activities within the concentration area: Activity A - The first phase 49/ was completed in August 1976 when the programme activity centre was temporarily located at WHO headquarters in Geneva and a memorandum of understanding was signed on scientific collaboration between UNEP and WHO regarding IRPTC. The second phase, 50/ the development of the programme activity centre, is progressing satisfactorily.

95. The IRPTC Scientific Advisory Committee held its first meeting in Geneva from 28 November to 3 December 1976. The committee reports to the Executive Director on all scientific aspects of the work of IRPTC. It recommended the possibility of holding occasional committee meetings jointly with the Environment Co-ordination Board's sub-group on IRPTC; interested international and national organizations may be invited to such meetings as observers.

96. Activity B - The network of correspondents is being built up through the following initiatives:

(a) Visits are paid by IRPTC staff to developing countries to locate and involve potential network partners, national correspondents and information sources. India, Iran, Malaysia, Singapore and Sri Lanka have so far been visited;

(b) Regional workshops are planned for 1977 and 1978 to help train national staff and establish close relations between the programme activity centre and national participants;

(c) Links with other bodies in the United Nations system have been facilitated by the decision of the Environment Co-ordination Board at its sixth session to establish a sub-group for IRPTC of its Working Group on Earthwatch. This sub-group will link IRPTC with appropriate agency programmes. By 1978, most national correspondents should have been designated.

46/ Decision 29 (III).

47/ Document UNEP/GC/61, para. 57.

48/ UNEP/GC/INFORMATION/1/Corr.1.

49/ FP/0107-75-05/Global/Internal/255,000/255,000/VII'75-XII'76/GC/61 and 96.

50/ FP/0107-76-03/Global/Internal/1,289,000/1,289,000/I'76-XII'77/GC/61 and 95.

97. To develop the IRPTC data bank, contacts were made in 1976 with existing data banks for potentially toxic chemicals, and close links established with the United States National Institute for Occupational Safety and Health (NIOSH) and the Environmental Chemical Data Information Network (ECDIN) of the European Communities. NIOSH has made available to UNEP, free of charge, its complete file on the mammalian toxicity of 21,000 chemicals, and IRPTC and ECDIN plan close co-operation between their two registers. OECD and the Council for Mutual Economic Assistance (CMEA) are also involved in the programme. Contacts have been established with the ILO International Occupational Safety and Health Information Centre.

98. The IRPTC data bank is now on computer in Geneva. Complete lists and files of available data on seven chemicals are being prepared and first drafts should be ready by mid-1977. A number of questions relating to chemical toxicity have already been addressed to IRPTC and replied to on the basis of the best information available. The register is expected to be operational by 1979, with a computerized capacity to cope with questions.

99. Other activities: Activity C - The development of the early warning system for potentially toxic chemicals is proceeding on lines proposed by the IRPTC Task Force (Nairobi, 1975) and the Scientific Advisory Committee.

100. Activity D - The proposed publications series will include:

- (a) A bulletin, the first issue of which will appear in 1977;
- (b) An annual report, the first to be published in 1978;
- (c) A series of publications to enhance popular awareness of issues related to potentially toxic chemicals, to begin in 1977. Initially, the bulletin will contain brief chapters on specific chemicals; later, separate monographs will be published.

(vii) IRPTC: Proposed Fund programme activities

101. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Continued development of IRPTC programme activity centre (paragraphs 94-95);
- (b) Regional workshops (paragraph 96 (b));
- (c) Publications programme (paragraph 100).

(d) Evaluation/review

102. The Governing Council's view that the Environment Co-ordination Board should establish sub-groups for research and evaluation and the Board's action in this regard, as well as the Governing Council's request to the Executive Director to develop evaluation and research programmes, have been reported in paragraphs 58-60 above.

103. The Earthwatch Working Group of the Board gave careful attention to the implications of the Council's request; the explanation of the review and evaluation functions which follows draws on the group's findings.

104. "Review", which past explanations of Earthwatch have used as synonymous with evaluation, may now be understood as a separate process, designed to determine flaws in the system, identify gaps and propose the means of filling them. Review is the feed-back loop in the system.

105. Evaluation has two functions within the assessment process:

- (a) The validation of environmental data and information which is closely connected to the monitoring, information exchange and research functions;
- (b) The interpretation required to assess the state of the environment and the trends that take place in it. Thus evaluation is the culmination of the assessment process.

106. At this point in the development of Earthwatch, comprehensive evaluation cannot yet be carried out, since it depends on the full functioning of the components of monitoring and information exchange. This is a further reason for establishing only one sub-group for both research and evaluation at this stage, and explains why it is not yet feasible to propose activities for evaluation. However, evaluation will be developed as the entire system progresses; initially, at least, it will be used to validate data and information within the other component parts of Earthwatch.

3. Assessment of basic human needs

(a) Introduction

107. For the reasons explained previously (paragraphs 15-18), assessment of basic human needs is regarded as an integral part of Earthwatch.

108. There are many problems associated with the assessment of needs. For example:

(a) Needs vary geographically and climatically;

(b) Different social systems may accord different orders of priorities in human needs;

(c) Though a degree of quantification is desirable, the setting of a level to represent the reasonable minimum is inevitably a somewhat arbitrary act.

109. Notwithstanding these problems, it would seem apparent that the basic needs for satisfactory human existence are food, health, shelter, clothing, education and creative employment. ^{51/} It is thus clear that the satisfaction of basic needs is intimately connected with the alleviation of acute poverty.

110. Over the last few years, there has been a growing recognition of the fact that growth of national output per capita is not sufficient to alleviate acute mass poverty. The satisfaction of basic human needs often requires reorientation of development strategies.

111. The problem of poverty and the satisfaction of human needs cannot be divorced from the degradation of the human environment because:

(a) Some problems of resource depletion and environmental degradation are a consequence of acute poverty. No lasting solutions to environmental problems such as deforestation, soil erosion and unhygienic surroundings are possible unless the poor are enabled to satisfy their basic needs through development;

(b) Strategies for alleviating poverty, being part of overall strategies of development, must take account of the availability of natural resources in particular, and implications for environmental quality in general, if they are to achieve a lasting improvement in human well-being.

(b) Objectives and strategies

112. Since no objectives and strategies have previously been formulated for the assessment of basic human needs, the Executive Director proposes the following:

Objectives:

Identification and promotion, in co-operation with relevant members of the United Nations system, of environmentally sound patterns of development that would permit the attainment of sustainable satisfaction of basic human needs without transgressing the outer limits;

Strategies:

(a) Promotion of assessment of the extent of non-satisfaction of basic human needs in regional and national contexts, and of the resources required for their satisfaction;

^{51/} UNEP/GC/58, para. 7.

(b) Identification and promotion of environmentally sound development alternatives - sectoral as well as general and national as well as international - that would promote the satisfaction of basic human needs in sustainable ways.

(c) Activities

113. The activities, which correspond to the first element of the strategy, are:

Activity A (1977-1978) - Developing an analytical framework for the assessment of basic human needs and their sustainable satisfaction (paragraph 114).

Activity B - Supporting quantification of the extent of non-satisfaction of basic human needs, and of the resources and approaches required to achieve their sustainable satisfaction, in national, sub-regional and global contexts (paragraph 115).

114. Activity A - A preliminary study of the methodological problems of assessing basic human needs and the resources required for their satisfaction is expected to be completed by March 1977. ^{52/} An expert meeting will be held to discuss the findings of this study. Methodological and conceptual studies in the field of assessment of basic human needs have also been initiated in various countries, and by some agencies in the United Nations system. ^{53/}

115. Activity B - UNEP's work in this field can only be a modest contribution to the larger national and international effort, which is concerned with establishing a fuller understanding of the concept of basic human needs, assessing their non-satisfaction and evolving alternative development strategies and life styles, in rich as well as poor countries, to provide those needs in sustainable ways. Following the tripartite World Employment Conference convened by the International Labour Office (ILO) in June 1976, ILO has initiated a major activity in this area. The Administrative Committee on Co-ordination (ACC) has plans to discuss at its spring 1977 session the general developmental objectives set by intergovernmental bodies and the means at the disposal of United Nations organizations to contribute to attaining them particularly in the context of eradicating poverty and satisfying basic needs. Accordingly, UNEP plans to work in close co-operation with ILO and other members of ACC concerned, such as the World Bank, WHO, FAO and UNESCO, in evolving a comprehensive and balanced international work programme in this area. As a first step, a network of collaborating national institutions is expected to be established which would work with comparable methodological approaches to assess the extent of non-satisfaction of basic human needs as well as to ascertain the resources and approaches required to achieve their sustainable satisfaction in national, sub-regional, regional and global contexts.

116. There is a close relationship between these activities aimed at assessment of basic needs and the actual promotion of strategies and programmes to achieve their satisfaction in environmentally sound ways. The latter, which corresponds to the second element of the strategy, is reported on under Environment and development (paragraphs 414 and 415).

(d) Proposed Fund programme activities

117. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Expert meeting on assessment of basic human needs (paragraph 114);

(b) Empirical work on assessment of basic human needs and their sustainable satisfaction in national and regional contexts, arising from the deliberations of ACC (paragraph 115).

4. The assessment of outer limits

(a) Basic concepts

118. Outer limits is a shorthand expression for the important concept that the biosphere, of which man is a part, has only a limited tolerance to the demands placed upon it by man's activities. When these limits are transgressed, human welfare - even life itself - is

^{52/} FP/1203-76-03/Global/Internal/60,000/60,000/IX'76-III'77/GC/96.

^{53/} FP/1303-76-02/Global/Internal/18,938/18,938/XII'75-III'76/GC/96.

threatened. No social or economic endeavour, including the satisfaction of basic human needs, can safely ignore the restraints imposed by outer limits. It is a function of Earthwatch to assess the dangers to the outer limits and give timely warning; through environmental management of man's activities, basic human needs can be satisfied without transgressing the outer limits, and to that end alternative patterns of development and life styles should be promoted.

119. Outer limits are of several kinds. Physical outer limits are those referring to the limited ability of natural systems to absorb waste without disruption and of renewable or non-renewable natural resources to be exploited without exhaustion. For example, the discharge of toxic substances into the oceans may eventually lead to the collapse of life within them; uncontrolled harvesting of marine living resources may have the same result.

120. Limits may also be social in character. Definition of such limits may be of importance in indicating if alternative patterns of development and life styles, less damaging to the environment, are socially acceptable.

121. Though outer limits should not be transgressed, they can sometimes be manipulated or extended to meet man's requirements. The activities in the area of bioproductivity, which envisage that photosynthetic productivity may be improved, are designed with such a possibility in mind.

122. Outer limits apply at various scales. Examples at the global level include climatic change and threats to the ozone layer. Outer limits of a regional nature would be approached when the health and productivity of a regional sea is seriously threatened by pollution, or when man's activities affect regional climatic patterns in such a way that food production could be seriously endangered. Outer limits exist, too, at the local scale; for example a lake threatened with accelerated eutrophication or a human settlement where environmental conditions are so bad that they create intolerable social pressures.

123. The complexity of outer limits is such that it will not be easy to identify them. For many years approximations and general indications of threats to the outer limits will have to suffice, and prudent action must be taken on the basis of the available knowledge, while acknowledging its deficiencies and the need to improve it.

(b) Objectives, strategies and concentration areas

124. The Governing Council has identified five elements of outer limits for special attention:

- (a) Climatic changes;
- (b) Weather modification;
- (c) Risks to the ozone layer;
- (d) Bioproductivity;
- (e) Social outer limits.

The strategies for the first four subjects were approved at the third session of the Governing Council; 54/ objectives and strategies for social outer limits were approved at the fourth session. 55/ The approved objectives and strategies have been summarized elsewhere. 56/ As pointed out earlier (paragraph 20), all five elements have been identified as concentration areas.

54/ Decision 29 (III).

55/ Decision 50 (IV), para. 4.

56/ UNEP/GC/INFORMATION/I, sect. II.A.1 (c) (i)-(v).

(c) Activities

(i) Climatic changes

125. The activities are:

Activity A - An international integrated programme of studies to improve understanding of natural climatic changes (paragraphs 126-127).

Activity B - Improved understanding of the possible effects of man's activities on local, regional and global climate (paragraphs 128-131).

Activity C - Improved understanding of the effects of the variability of climate on human activities, in particular food production and land use (paragraphs 132-134).

126. Activity A - In recent years a number of actions were undertaken by intergovernmental organizations in co-operation with UNEP in order to throw more light on the problem of natural climatic changes and their consequences for mankind. It is now clear that the problem is complex, and that a satisfactory understanding of climatic changes can be achieved only by co-ordinated, long-term international efforts.

127. At the joint programming meeting with WMO in September 1976, it was agreed that UNEP and WMO would co-operate in the following activities:

(a) The First GARP Global Experiment (FGGE), ^{57/} which is reported under GEMS (paragraphs 53-54), and the World Weather Watch will provide improved data for modelling the atmosphere and the world's climate;

(b) Drafting a plan for integrated, international research on natural climatic change through modelling and other appropriate approaches;

(c) Planning of a global conference on climatic change, to cover various aspects of climatic variability, and in particular its effects on human activities;

(d) The organization of a Government Expert Group on Climate-Related Monitoring, which is reported under GEMS (paragraph 51).

128. Activity B - This is closely connected with Activity A, and cannot be fully realized without a better understanding of the causes of natural climatic changes. Nevertheless, certain initiatives should be undertaken immediately, in particular the collection of data on the possible impact of human activities on climate. Monitoring of background levels of air pollution ^{58/} carried out by WMO (see paragraph 45), and the world glacier survey ^{59/} carried out by UNESCO, both within the GEMS framework, are examples of actions of this kind which are already under way.

129. The addition of carbon dioxide to the atmosphere through man's activities, and its possible impact on climate, are of special concern. To review this problem, WMO recently organized a special workshop, in which UNEP co-operated, the recommendations of which will be included in the integrated international programme for research on climatic change. Activities with regard to the ozone problem are also relevant to Activity B (paragraphs 140-142).

130. WMO plans to initiate pilot studies in certain marginal arid lands to examine the meteorological impact of agricultural practices; this will be useful in identifying the possible impact of man's activities upon climate in those regions.

^{57/} FP/1301-77-01/Global/WMO/100,000,000/1,070,000/1'77-11'80/GC/96.

^{58/} FP/0800-74-06/Global/WMO/1,200,100/585,100/X'76-X'78/GC/96.

^{59/} FP/1301-76-02/Global/UNESCO/136,000/82,000/11'76-X'77/GC/96.

131. Also relevant to this action is a UNEP-supported study by the International Institute for Applied Systems Analysis (IIASA) on the impact on climate of heat liberated by the production and use of energy, 60/ taking into consideration possible future developments in global energy production and use. The results of this study are expected to be available in 1978.

132. Activity C - Many of the preparatory activities for the United Nations Conference on Desertification are relevant to this problem. The background document on climate and desertification prepared by UNEP, the case studies on desertification organized by the United Nations Development Programme (UNDP) and UNESCO in a number of countries, and the maps prepared by UNEP, FAO, UNESCO and WMO on arid lands and areas undergoing desertification will provide important information on the influence of climatic variability on conditions in marginal arid lands. 61/

133. The effects of climate and climatic variability on land use and agricultural management have been studied by WMO, in co-operation with UNEP, in the Sudano-Sahelian region of Africa. The report of this study will be published in 1977, when it is also planned to extend the study to the arid and semi-arid areas of Eastern Africa and the Arabian peninsula. Several of the activities undertaken by UNESCO under the MAB programme and the Integrated Project on Arid Lands (IPAL), and by FAO under its programme for Ecological Management of Arid and Semi-Arid Rangelands (EMASAR) - some of which are undertaken in collaboration with UNEP - are also relevant to this action (see, for example, paragraphs 262-266).

134. The International Federation of Institutes for Advanced Study (IFIAS) 62/ is carrying out a study in co-operation with UNEP of the global problem of drought and its economic, social and political consequences. It is expected that the global conference referred to above (paragraph 127 (c)) will recommend further steps relevant to Activity C.

(ii) Weather modification

135. The activities are:

Activity A (1977-1984) - Assessment of the environmental impact of weather modification experiments (paragraph 136).

Activity B (1977-1978) - The development of general principles and guidelines for international and national activities on weather modification (paragraphs 137-138).

136. Activity A - The main action under this activity is the Precipitation Enhancement Project of WMO, the objective of which is to assess the scientific credibility of precipitation enhancement and the environmental impact of the operation within and outside the target area. UNEP intends to participate in the project to ensure that a careful environmental assessment is undertaken.

137. Activity B - In accordance with the decision of the Governing Council at its fourth session, 63/ the meeting of experts designated by Governments 64/ has been deferred and consultations are being held with WMO on the possibility of holding a meeting of experts in their personal capacity to follow up the various matters explored during the previous meeting on legal aspects of weather modification in November 1975. The new meeting, which it is hoped could be convened later in 1977 or in 1978, would consider the desirability of promoting the collection and exchange of information on weather modification experiments and results, consultation between States concerned, development of guidelines for national legislation, etc.

60/ FP/0700-75-02/Global/IIASA/589,000/300,000/1'76-X'78/GC/96.

61/ UNEP/GC/95 and UNEP/GC/95/Add.1.

62/ FP/1303-75-07/Global/IFIAS/388,000/212,500/1'76-VIII'78/GC/96.

63/ Decision 50 (IV), para. 9.

64/ UNEP/GC/61, para. 298.

138. In considering actions under this activity, due consideration will be given to the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques which was approved by the General Assembly at its thirty-first session. 65/

(iii) Risks to the ozone layer

139. The activities are:

Activity A - Assessment of the effects of chemicals on the ozone layer (paragraphs 140-142).

Activity B - Assessment of the effects of natural and man-induced modifications of the ozone layer, particularly of changes in ultraviolet radiation on human health, animals and plants (paragraphs 140-142).

140. Activities A and B - In line with a request of the Governing Council, 66/ there will be a meeting of experts designated by Governments and international governmental and non-governmental organizations in Washington, D.C. from 1 to 9 March 1977. 67/ The meeting will review all aspects of the ozone layer, including those referred to in the Executive Director's report to the Governing Council at its fourth session, 68/ identify on-going activities and future plans, and agree on a division of labour and a co-ordinating mechanism for, inter alia, the compilation of research and monitoring activities and future plans and the collection of related industrial and commercial information. This meeting will be reported on, with recommendations, in an addendum to the present document.

141. UNEP co-operates closely with other international, governmental and non-governmental organizations active in this field. For example, WMO has conducted a large programme on the ozone layer for a number of years (its Global Ozone Research and Monitoring Project began in 1976), WHO is studying the effects of ultraviolet radiation on man and other living organisms, and the International Civil Aviation Organization (ICAO) is concerned with the impact of aircraft emissions on the ozone layer. In addition, many countries implement large national programmes, for instance the United States, through the National Oceanic and Atmospheric Administration, and Canada, through Environment Canada.

142. Risks to the ozone layer relate closely to several other aspects of the environment programme, such as climatic changes, human and environmental health and GEMS. A further discussion of the ozone problem is to be found in the state of the environment report for 1977. 69/

(iv) Bioproductivity

143. The activities are:

Activity A - Assistance to studies of and research into the mechanisms and genetics of photosynthesis (paragraph 144).

Activity B - Preparation and initiation of an integrated programme of studies to further understanding of biogeochemical cycles and their effects on bioproductivity (paragraph 145).

Activity C - Dissemination of the results of research to facilitate their application to increasing bioproductivity (paragraph 146).

65/ Resolution 31/72; see also UNEP/GC/104.

66/ Decision 65 (IV).

67/ FP/1303-76-04/Global/Internal/116,000/116,000/IX'76-11'77/GC/96.

68/ UNEP/GC/61, paras. 303-308.

69/ UNEP/GC/88, sect. 11.

144. Activity A - An interdisciplinary expert group, convened on the occasion of the seventh International Congress on Photobiology in Rome during August 1976, concluded that improved photosynthetic productivity depended on fundamental research in a number of areas, including hazards of solar UV-radiation to biological productivity, biomass potential of aquatic plants, ecological and physiological distribution of photosynthetic types, and genetic and environmental manipulation of the process. UNEP will encourage and stimulate work on these topics through UNESCO, the International Committee on Photobiology, ICSU and other bodies concerned.

145. Activity B - In co-operation with UNEP, SCOPE and the Royal Swedish Academy of Sciences have completed a first, general review of the biogeochemical cycles of nitrogen, phosphorus and sulphur. ^{70/} Reports of their findings can be found in *Ambio* ^{71/} and SCOPE's report to the ICSU General Assembly. ^{72/} A workshop on the biogeochemical cycling of carbon, co-sponsored by UNEP and the national SCOPE committees of the Federal Republic of Germany, the Netherlands and Sweden, will take place at Hamburg/Ratzeburg, Federal Republic of Germany, on 21-26 March 1977; a second workshop will be held at Fort Lauderdale, United States also in March, and a third is planned to take place at Seattle in November 1977. SCOPE will then draw together the results of these workshops into an up-to-date evaluation of the existing knowledge of the biogeochemical cycling of carbon. The participation of United Nations bodies, such as WMO and FAO, will be sought in undertaking a series of studies on how the increase in the chemical loading of the biosphere affects the biogeochemical cycles vital to the support of life.

146. Activity C - It is intended to keep under review other aspects of the biosphere which may impose serious constraints on bioproductivity as, for example, large-scale disturbances in the hydrological cycle or extensive losses in fertile land. Throughout, UNEP will stimulate research and disseminate knowledge, acting always in collaboration with other bodies.

(v) Social outer limits

147. Though the concept of social outer limits is still at a formative stage, it is clearly of greater practical value if viewed in relation to changes in the physical environment. Accordingly, the interpretation of social outer limits put forward at the fourth session of the Governing Council was "limits to the rate at which society can change in accord with environmental constraints or environmental requirements". ^{73/}

148. The capacity of a society to adapt to changes in the environment, including extreme forms of environmental degradation, varies greatly between different societies and over time. Moreover, the environmental constraints or requirements imposed upon societies differ greatly, for example in terms of access to scarce natural resources or experience of environmentally unsound development. In view of these difficulties, it was explained at the fourth session of the Governing Council that what was needed was "... increased knowledge, in social terms, about both the process of continued environmental destruction and the difficulties of adopting various solutions to environmental problems". ^{74/}

149. Thus the activity for social outer limits is: elaboration of the concept so as to provide guidance on further work required in this area (1977) (paragraph 150).

150. A study of the concept of social outer limits is under way and should be complete by mid-1977. ^{75/} Several other activities in the environment programme are also relevant to this activity, for example those in the area of environmental statistics (paragraphs 160-164) and empirical studies by UNEP and the United Nations Research Institute for Social Development

^{70/} FP/1303-76-01/Global/RSAS/87,500/45,500/XII'75-IX'76/GC/96.

^{71/} Special issue of *Ambio: A Journal of the Human Environment*, Royal Swedish Academy of Sciences, Stockholm.

^{72/} Chapter 2B in "Environmental Issues 1976": Report on SCOPE to ICSU General Assembly, October 1976.

^{73/} UNEP/GC/61, para. 312.

^{74/} UNEP/GC/61, para. 313.

^{75/} FP/1303-76-03/Global/Internal/60,000/60,000/IX'76-III'77/GC/96.

(UNRISD) on the role of perceptions, attitudes and values in relation to environmental programmes and measures (paragraph 404). Activities within the system on indicators of social well-being and quality of life are also relevant to work in this area.

(d) Proposed Fund programme activities

151. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Climatic changes

- (i) Integrated programme for studies on climatic changes (paragraph 127 (b));
- (ii) Global conference on climatic changes (paragraph 127 (c));
- (iii) Studies of climatic impact of increase of CO₂ (paragraph 129);
- (iv) Extension of WMO studies relating to effects of land use and agriculture on climate (paragraph 133);

(b) Weather modification

- (i) WMO Precipitation Enhancement Project (paragraph 136);
- (ii) Expert meeting on general principles and guidelines (paragraph 137);

(c) Risks to the ozone layer

- (i) Washington meeting (paragraph 140);
- (ii) Follow-up activities of the recommendations of the Washington meeting (paragraph 140);
- (iii) Continued support for WMO Global Ozone Research and Monitoring Project (paragraph 141);

(d) Bioproductivity

- (i) Support for interdisciplinary studies on photosynthesis (paragraph 144);
- (ii) Workshops on biogeochemical cycles (paragraph 145);
- (iii) Review of other constraints to increase in bioproductivity (paragraph 146).

5. Major policy issues for the attention of the Governing Council

152. The Governing Council may like to focus its policy discussion principally on the following issues:

(a) Earthwatch - The explanation of the general concept of Earthwatch especially in relationship to outer limits and basic human needs (paragraphs 11-19);

(b) GEMS - The response to Governing Council decision 63 (IV) (paragraphs 28-34);

(c) IRS - The proposed revision of the objectives and strategies for IRS and the need for more active participation by Governments in the development and operation of the system (paragraphs 71 and 73-78);

(d) The proposed objectives and strategies for the assessment of basic human needs (paragraph 112);

(e) Outer limits - The plans for a more coherent programme in climatic changes (paragraphs 126-134), recommendations regarding the programme of action on risks to the ozone layer (paragraph 140), and proposals in the area of bioproductivity (paragraphs 144-146).

B. ENVIRONMENTAL DATA

1. Introduction

153. One of the difficulties frequently encountered in environmental assessment and management is the lack of hard data. A number of activities of the environment programme have been designed to provide such data, for example, those under the monitoring (GEMS) and information exchange (IRS and IRPTC) components of Earthwatch. However, two sorts of data-related activities do not properly fall under Earthwatch:

(a) The development of an environmental statistics system, principally for application at the national level;

(b) The collection of data on environmental activities for Level One, and of data for the state of the environment reports.

154. Last year, environmental statistics were considered as part of environmental management ^{76/} and activities in relation to Level One data were reported on to the Governing Council at both its third and fourth sessions in the Level One document. ^{77/} With a clearer understanding of the role of statistics in environmental assessment and with the amalgamation of the three levels into one document, it is logical to bring these considerations together.

155. There is an increasing demand for environmental statistics to forecast environmental consequences of current trends and events, to construct models of environment/development relationships to facilitate planning and decision-making, and to review the effectiveness of policies.

156. The environment contains both natural and man-made elements interacting in a dynamic system. Environmental statistics relate to the stocks and flows of all elements of the system, and permit the identification of environmental trends. Statistics collected for purposes other than environmental assessment may have a limited use in environmental management: what is needed is a regular, orderly and comprehensive supply of environmental information.

157. A number of international organizations, including the United Nations Statistical Office, the United Nations regional commissions and OECD, and several national statistical offices carry out activities which are relevant to the development of such a system. However, their activities are insufficiently co-ordinated, both in the development of basic concepts and in the systems they use for classification and presentation. In order to ensure comparability within and between countries, a system for environmental statistics should be developed very much along the lines followed in the guidelines for the development of national accounts prepared within the framework of the United Nations Statistical Commission. In the preparation of such a system there are two aspects to be considered: examination of existing relevant methodologies in order to identify and specify the type of data and statistical information required, and the costs and benefits associated with the development of statistical systems and data collection.

2. Objectives and strategies

158. The inclusion of environmental statistics in the strategy was endorsed by the Governing Council at its fourth session. ^{78/} In respect of environmental data on activities for Level One, the Governing Council took decisions at its third ^{79/} and fourth sessions ^{80/}

^{76/} UNEP/GC/61, para. 318 (k).

^{77/} UNEP/GC/30, paras. 1-10, and UNEP/GC/60, paras. 1-11.

^{78/} Decision 50 (IV), para. 5 (e).

^{79/} Decision 27 (III).

^{80/} Decision 48 (IV).

which laid down the broad approach to the collection and presentation of data for this purpose.

3. Activities

159. The activities are:

Activity A (1977) - Inventory of requirements and availability of environmental statistics (paragraph 160).

Activity B (1977-1980) - Collection and compilation of available data on certain environmental aspects (paragraph 161).

Activity C - Development of guidelines on methodologies and tabulations for statistics on the environment, for use by countries and international organizations (paragraph 162).

Activity D (1979-1980) - Pilot case studies on environmental statistics and environmental data collection (paragraph 163).

Activity E - Adoption of environmental statistics systems by Governments (paragraph 164).

Activity F - Review of the work of the Inter-Agency Task Force on Data (IATFD) and continued collection of data on activities for Level One and environmental data for state of the environment reports (paragraphs 165-166).

160. Activity A - The main activity is a survey of international, governmental and non-governmental users of environmental statistics to determine:

- (a) The policy-related problems to which environmental statistics might be relevant;
- (b) The kinds of data, available, planned or needed, to meet these needs; and
- (c) The kinds of analytical models available or being developed, their uses and their data requirements.

UNEP and the United Nations Statistical Office have agreed in the course of joint programming (October 1976) to co-operate in this activity; the regional commissions and interested agencies should also be involved.

161. Activity B - Includes the collection and compilation of:

- (a) Statistics on environmental aspects of human settlements; These will cover population distribution and density, its relation to economic activities and to housing and sanitary facilities and services, and assessment of such environmental aspects of human settlements as pollution, water supply and waste disposal;
- (b) Statistics on environmental aspects of energy and non-renewable materials; There is a need to reformulate the procedures now followed by the United Nations Statistical Office for gathering statistics on energy and non-renewable materials so as to yield data on energy and material balances, and to examine the feasibility of collecting and compiling data on the emission, abatement and re-cycling of pollutants and wastes;
- (c) Statistics on other environmental aspects; Data should be gathered on other areas of the environment programme, such as environmental health, oceans and terrestrial ecosystems.

162. Activity C - It is clear that guidelines and methodologies need to be developed for environmental statistics. Initially the development of guidelines, which will be undertaken in co-operation with the United Nations Statistical Office, will cover concepts, definitions and classifications for analysing and tabulating statistics on:

- (a) The environmental aspects of human settlements, together with related guidance on sources and methods of data collection;
- (b) The environmental aspects of energy and non-renewable materials; part of this work is already in progress in several organizations, notably ECE and OECD.

163. Activity D - Pilot case studies will be undertaken in three countries at different levels of development, mostly in 1978 and 1979. These studies will test the outcome of Activities B and C, yield valuable data on environmental conditions in the selected countries, and support country missions initiated by UNEP (paragraph 402-403).

164. Activity E - The long term intention of the preceding activities is to secure a universally acceptable system of environmental statistics. Through the United Nations Statistical Commission, it is intended to reach agreement on a system of environmental statistics for adoption by Governments.

165. Activity F - At its fourth session, the Governing Council decided that IATFD should continue as long as necessary and be designated a subsidiary body of the Environment Co-ordination Board. 81/ The Board noted this decision and asked its focal points to review the mandate, achievements and work plan of the Task Force and to report to it at its seventh session. 82/ A third meeting of IATFD will be held during 1977 to undertake this review and advise the focal points on what it believes should be the future direction of its work.

166. Collection of data activities for Level One will continue, initially on the lines requested by the Governing Council at its fourth session, in which it asked for reviews by the time of the sixth session on:

- (a) Environmental management;
- (b) Environmental education and training;
- (c) Environment and development; 83/

The collection of environmental data for the state of the environment reports will also continue.

4. Proposed Fund programme activities

167. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Co-operation with the United Nations Statistical Office in developing an environmental statistics system (paragraphs 160-164);
- (b) Support for IATFD (paragraph 165);
- (c) Level One and state of the environment data collection (paragraph 166).

5. Major policy issues for the attention of the Governing Council

168. The Governing Council may wish to focus its policy consideration of this section on:

- (a) The proposals to develop an environmental statistics and other environmental data collection systems and the need for active Government interest in them (paragraphs 160-164);
- (b) The improvement of data collection for the Level One exercise and the state of the environment reports (paragraphs 165-166).

81/ Decision 47 (IV), part II, para. 5.

82/ UNEP/GC/89, para. 24.

83/ Decision 48 (IV), para. 3 (b) (iv)-(vi).

Chapter III

PRIORITY SUBJECT AREAS

169. The priority subject areas are the six major divisions of subject matter in the environment programme. The areas, which first began to take shape in the Action Plan ^{1/} adopted at the Stockholm Conference and which have been refined by succeeding sessions of the Governing Council, are "natural" groupings, corresponding broadly to areas of environmental concern and around which disciplines have developed; they are, however, neither uniform nor discrete. Thus for UNEP "human settlements and human health" are concerned with the built environment, pollution and environmental health; "terrestrial ecosystems" and "oceans" correspond to the two major divisions of the earth's surface; "environment and development" deals with the interface between these two considerations; "energy" covers the environmental impact of energy production and use; and "natural disasters" is largely concerned with an aspect of the environment's impact on man. It is in the nature of environmental issues that subject areas overlap, and thus there is much interplay between activities in each division; this is covered by cross-reference. Also, since activities under the priority subject areas include assessment, supporting measures and management, there is a frequent need for cross-reference to chapter II (Environmental assessment), chapter IV (Supporting measures), chapter V (Environmental management including environmental law); GEMS apart, the full account of the activity is normally given under the priority subject area, with a cross-reference in the chapter on the appropriate functional task.

A. HUMAN SETTLEMENTS AND HUMAN HEALTH

1. Human settlements and habitat

(a) Summary of the Level One overviews ^{2/}

(i) General development of human settlements ^{3/}

170. The planning of human settlements has become increasingly important in view of the growth of world population, rural-urban migration and the need to promote social and economic development through improved human settlements. It is important that the planning and management of human settlements should be an integral part of the national planning process, and should aim to secure an improvement in the quality of life, both physical and social, of the present and future inhabitants of these settlements.

^{1/} United Nations Publication, Sales No.: E.73.II.A.14, pp. 6-28.

^{2/} The two overviews are reported on together because they provide the basis for objectives, strategies and activities covering both the general development of human settlements and human settlements technology.

^{3/} For a detailed account of the overview, see UNEP Report No. 1, 1977.

171. Many of the activities carried out by the United Nations agencies and other international bodies relate to the general development of human settlements, especially those of the United Nations Centre for Housing, Building and Planning (CHBP), the United Nations Habitat and Human Settlements Foundation (UNHHSF), the World Bank, UNICEF and the United Nations regional commissions; ILO, UNESCO, UNDP, WMO, UNDRO and others are also involved. 4/ Habitat: United Nations Conference on Human Settlements, 5/ convened at Vancouver in 1976, was the first major international conference on the future development of human settlements; its main achievement was the adoption of a large number of recommendations for action at the national level, and international recognition of the importance of action at the sub-regional and regional levels.

172. The following major inadequacies in knowledge and action have been identified in the overviews:

- (a) Inadequacies in knowledge relating to:
 - (i) Methods of assessing conditions in human settlements and, in particular the relationship between settlements and surrounding ecosystems;
 - (ii) Practical methods for defining the environmental carrying capacity of settlements;
 - (iii) Methodology and guidelines for comprehensive planning, with particular reference to developing countries;
 - (iv) Ways and means of enhancing public participation in human settlements planning and development;
 - (v) Planning techniques for rural settlements, and for "marginal" or "transitional" areas;
 - (vi) Alternative policies for land reform;
 - (vii) Standards for measuring the efficient functioning of human settlements;
- (b) Inadequacies in action:
 - (i) Training and education to promote better understanding at all levels of the general development of human settlements;
 - (ii) A national, regional and international network to compile and exchange information on the general development of human settlements; establishment or reinforcement of institutions for the development of the human settlements; and the participation of national professional societies and non-governmental organizations in the general development of human settlements;

4/ For a detailed account of the United Nations and the Intergovernmental and non-governmental organizations, see UNEP Report No. 1, 1977.

5/ FP/0104-76-04/Global/Internal/28,000/28,000/111'76-IX'76/GC/96.

- (iii) The development of techniques and administrative arrangements for comprehensive planning of urban and rural settlements at national and local levels;
- (iv) Legislation to protect and improve the environment of settlements, including review of unrealistically high building standards;
- (v) Implementation of existing plans for infrastructural networks, especially in developing countries.

(ii) Human settlements technology 6/

173. Human settlements technology embraces all the technological inputs, both physical and mental, required to create human settlements which satisfy the needs of the community. Human settlements technology should take into account factors relating to the cost, site requirements, design, construction techniques, materials, tools, organizational requirements, resources and the effect on the environment.

174. Appropriate technologies are needed for human settlements support systems for water supply, waste management, energy supply, transportation and communications; such a development is crucial for the health and functioning of human settlements and for conserving natural resources.

175. The need to use appropriate technologies is most marked in developing countries, partly because they lack capital resources; economic and environmental considerations suggest using locally available building materials, designs adopted from traditional settlements, and labour-intensive technologies.

176. Several United Nations agencies and bodies are involved in major activities related to human settlements technology: CHBP, UNIDO, ILO, WHO, FAO, UNESCO, UNDRP and the regional commissions. Some intergovernmental organizations such as the North Atlantic Treaty Organization (NATO), OECD, the Organization of American States (OAS), and the International Council for Building Research, Studies and Documentation (CIB) are also involved. 7/

177. Following the Habitat Conference recommendations, which were endorsed by the General Assembly at its thirty-first session, the United Nations regional commissions will be strengthened in their human settlements activities. 8/ UNEP already co-operates with the commissions in establishing a network of sub-regional centres to encourage consortium-type research.

6/ For a detailed account of the overview, see UNEP Report No. 1, 1977. FP/0106-76-03/Global/Internal/28,000/28,000/V1'76-XI'76/GC/96.

7/ For a detailed survey of the activities of United Nations agencies and intergovernmental and non-governmental organizations, see UNEP Report No. 1, 1977.

8/ General Assembly resolution 31/116, sect. IV.

178. The following major inadequacies in knowledge and action have been identified in the overview:

(a) Inadequacies in knowledge relating to:

- (i) Rational methods for identifying suitable locally-available natural building materials; appropriate technologies for manufacturing building materials; low-cost technologies for waste water treatment; water management systems for rational water use in settlements; appropriate technologies for water treatment, especially in rural areas; appropriate methods of solid waste disposal and/or recycling and appropriate technologies for protecting human settlements against natural disasters;
- (ii) Energy conservation in human settlements, and technologies for harnessing renewable sources of energy, especially in rural areas;
- (iii) Promotion of integrated development of human settlements infrastructures and services;

(b) Inadequacies in action:

- (i) Strengthening of regional and international networks for exchange of research data and technical information on human settlements technology; transfer of appropriate technologies to developing countries; and technical assistance to developing countries to develop capabilities in human settlements technology;
- (ii) Training and education at all levels to develop human settlements technology, and specifically training of construction personnel;
- (iii) Self-reliance technologies, especially in rural areas;
- (iv) Legislation to regulate the siting of industries and control waste collection and disposal;
- (v) Establishment or reformulation of appropriate building regulations and standards for building materials and construction practices, particularly for developing countries.
- (vi) Legislation to regulate the siting of human settlements in disaster-prone areas.

(b) Objectives, strategies and concentration areas

179. The Governing Council endorsed the objectives and strategies for human settlements and habitat at its third session. 9/ These have been summarized elsewhere. 10/

180. However, in the light of the recommendation of the Habitat Conference and the conclusions of the Level One overviews on the general development of human settlements and human settlements technology (see paragraphs 170-178), the Executive Director proposes to revise the approved objectives and strategies as follows:

9/ Decision 29 (III).

10/ UNEP/GC/INFORMATION/I, sect. III.A.1 (d) (i) and (ii).

Objectives:

(a) To ensure that national human settlements policies are integral parts of national development policies for improvement of the human environment and equitable distribution of the benefits of development; thus human settlements policies should be both an aim of development and a means by which environmentally sound development is secured;

(b) To promote public participation in human settlements planning and development;

(c) To ensure that basic infrastructure services have priority in planning and implementing human settlements programmes, so that the greatest number of people benefit and maximum opportunities are provided for self-help;

Strategies:

(a) Attention should be paid to the way in which the costs and benefits of living in human settlements are distributed, a matter to which the Habitat Conference recommended Governments should give more attention. Costs should be adjusted to the ability to pay and priority in the distribution of benefits should be given to those most urgently in need of them;

(b) Public participation requires the establishment of appropriate arrangements for the public voice to be articulated and heard. Encouragement should be given in planning and constructing human settlements to self-help and other individual community initiatives;

(c) Pilot projects are required to demonstrate to Governments the benefits of a flexible and integrated approach to the development of human settlements service system; these projects should take account of the need for appropriate and environmentally sound human settlements technologies which protect and enhance the environment while providing relevant solutions to problems.

[8]. At its fourth session the Governing Council agreed that the following should be considered concentration areas: 11/

(a) Support to the preparation for Habitat: United Nations Conference on Human Settlements; 12/

(b) Ensuring that UNHHSF becomes operational; 13/

(c) Developing activities in the field of human settlements technology, with particular reference to marginal settlements. 14/

11/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

12/ FP/0105-75-01/Global/Internal/3,075,000/3,075,000/VI'74-XII'75/GC/68.

13/ FP/1500-75-01/Global/Internal/4,000,000/4,000,000/I'75-XII'78/GC/96.

14/ Document UNEP/GC/57, para. 4, and decision 47 (IV), part 1, para. 3.
FP/0104-76-01/Regional/UN-ESA/575,600/370,000/IX'76-VIII'79/GC/96.
FP/0104-76-02/Regional/Philippines/1,261,000/689,000/V'76-VI'78/GC/96.
FP/0104-76-03/Regional/Indonesia/1,543,000/869,000/VIII'76-III'79/GC/96.

(c) Activities

182. The activities are:

Activities within the concentration areas

Activity A (completed) - Support to the preparations for Habitat: United Nations Conference on Human Settlements (paragraphs 183-184).

Activity B (completed) - Ensuring that UNHHSF becomes operational (paragraph 185).

Activity C (1977-1980) - Promotion of environmentally sound and appropriate human settlements technology through the establishment of regional networks of institutions and by on-site upgrading of slums and marginal settlements (paragraphs 186-189). 15/

Activity D - Support for the continued training of professionals and administrators for human settlements (paragraphs 190-191). 16/

Activity E - Assistance to Governments in formulating policies and programmes for human settlements (paragraphs 192-194). 17/

Other activities

Activity F (1976-1978) - Development, application, testing and refinement of the concept of human settlements as ecosystems and the expansion of this concept, if found viable, into a basic approach to planning human settlements (paragraph 195). 18/

Activity G - Development of environmental strategies and programmes for rural settlements (paragraph 196).

(i) Activities in the concentration areas

183. Activity A - Specific action is complete, since the Conference has taken place. Among immediate follow-up activities are those concerning the use of the audio-visual and other material produced for the Conference.

184. The recommendations of the Conference, which covered planning, technology and management issues, largely confirmed UNEP's strategies and will continue to be a major factor in guiding future activities of UNEP in the field of human settlements.

185. Activity B - UNEP's specific responsibility for this area has been discharged, and UNHHSF is now operational. 19/ Working relations between the two institutions are close and must continue to be so because the Foundation has a major responsibility for mobilizing the resources needed for human settlements activities. UNEP's interest will be to ensure that environmental factors are fully taken into account in the Foundation's activities.

186. Activity C - The areas in which there is the most urgent need for development of new technologies for human settlements are:

(a) Water supply, which should concentrate on collection, preservation, storage, recycling (multi-purpose) and minimum consumption, through systems which do not require an expensive or complicated infrastructure;

15/ FP/0106-77-01/Regional/ECLA/675,650/625,650/11'77-11'79/GC/96.
FP/0106-77-02/Regional/ESCAP/45,000/30,000/V'77/GC/96. FP/0106-77-03/Regional/ECA/ECWA/1,300,000/1,200,000/GC/96.

16/ FP/0104-75-07/Global/UNESCO/1,226,000/875,000/GC/96.

17/ FP/0104-75-06/Regional/UNDP-UN-ESA/10,443,000/393,200/VI'76-VIII'78/GC/96.

18/ FP/0104-76-05/Global/UNESCO-WHO- INTECOL/630,000/247,000/X'76-XII'77/GC/96.

19/ UNEP/GC/93.

(b) Waste disposal, which should combine the most efficient systems of disposal, recycling and alternative uses, taking account of cost, health requirements and resource conservation;

(c) Energy, particularly renewable sources and techniques of human settlement planning which minimize amounts of energy used;

(d) Transport, which should economize on the use of energy and resources by appropriate design and planning techniques;

(e) Building materials and techniques of an appropriate local, low-energy, renewable, recyclable and disaster-resistant kind.

187. Governments, international agencies and some non-governmental organizations are actively developing and implementing environmentally sound technologies for use in human settlements. Examples are WHO, particularly in water and waste technologies; CHBP in aspects of planning and building technologies; and UNEP through a number of activities usually undertaken in collaboration with other organizations, such as those on disaster prevention with UNDRO. However, UNEP's main long-term activity in this area is the development of a programme for environmentally sound and appropriate technologies as part of the priority subject area Environment and development (see paragraphs 434-435). Activities which take place in the Human settlements priority subject area will be fitted within this broader programme.

188. Emphasis is placed on co-ordinating the activities of institutions working in the field of human settlement technology, so as to facilitate information exchange and avoid duplication. To reflect the diversity of conditions in different parts of the world, and in line with the recommendations of the Habitat Conference and with General Assembly resolution 31/116, section IV, UNEP is developing activities, in collaboration with the regional commissions and CHBP, leading to a set of regional networks of institutions which will together constitute a part of the global network for environmentally sound and appropriate technologies.

189. Environmentally sound and appropriate technologies to upgrade slums and other marginal settlements are being tested on-site. On-site upgrading of existing areas is cheaper than large-scale clearance and redevelopment; it preserves community structure, develops self-reliance and involves citizen participation. To illustrate the advantages of improving slums and marginal settlements, and to demonstrate the utility of environmentally sound technology demonstration projects are under way in the Philippines and in Indonesia (CHBP, UNHHSF, Governments concerned and UNEP). In the next few years, similar activities will be launched in other parts of the world to illustrate the relevance of the approach in different environmental, social and economic conditions.

190. Activity D - 'A two-phase training programme for human settlements managers is under way in co-operation with national institutions and UNESCO. The first phase has been completed and was evaluated at a meeting (Budapest, June 1976) which recommended the kinds of teaching material to be used in training courses in different regions. In the second phase, instruction methods are being developed for two purposes: to train human settlement managers in a comprehensive approach to human settlements problems while identifying, through seminars, particular environmental issues, such as efficient use of energy, water and building materials, and pollution control; and to train those who will in turn give further training courses.

191. Many actions being sponsored by other international organizations are relevant to this activity, for example: the UNEP/UNESCO collaboration in environmental education and training (paragraphs 563-565); training of engineers by UNESCO; training for physical planners, architects and town planning technicians (CHBP, UNDP, the United Nations Fund for Population Activities (UNFPA) and the United Nations Children's Fund (UNICEF)). OAS undertakes numerous activities in this area, usually through regional training seminars.

192. Activity E - The Habitat Conference produced many recommendations for national action which are directly relevant to this activity. It is intended to produce guidelines for human settlements planners and managers which build on and supplement the Habitat advice, and thereby promote the proper place of environmental and ecological considerations in human settlements planning and management.

193. The collection and dissemination of human settlements information is vital in advancing human settlements planning. CHBP, non-governmental organizations, which the Habitat Conference recommended should be strengthened, and the regional commissions are well placed to help make information available. UNEP intends to support this activity, in particular by facilitating the transfer of ideas and know-how from non-governmental organizations to regional, national and local authorities.

194. Besides the activities planned in the area of human settlements technologies, UNEP will give consideration to producing a handbook which describes a number of different environmentally sound approaches to planning a new settlement for about 150,000 low-income persons in a developing country and recounts of how a number of existing settlements have coped with environmental problems.

(ii) Other activities

195. Activity F - UNEP has prepared a first draft discussion paper on the concept of human settlements as ecosystems. It provides a basis for strategies for human settlements development in which priority is given to self-sustainment by minimizing demands on natural resources, maximizing use of renewable resources and reducing pollution and danger from natural disasters. This paper will be subjected to critical review and it should then be possible to consider whether it is desirable to move to the next phase in this activity: in co-operation with UNESCO, field testing, through pilot projects, of the practical application of the concept of human settlements as ecosystems, possibly as part of ecodevelopment activities (see paragraph 408 (b)).

196. Activity G - The objectives and strategies for human settlements emphasize balance, an important aspect of which is balance between town and country. More attention needs to be paid to rural settlements in their own right, as an aspect of integrated rural development and to contribute to stemming the flow of migrants to towns. Integrated rural development is the concern of ILO, CHBP, FAO, the World Bank and other organizations, within and outside the United Nations system. Over time, UNEP's contribution to these activities should be considerable, for example, by promoting environmentally sound and appropriate technologies in the field of rural human settlements. Pre-programming activities will be undertaken in the coming year with a view to presenting proposals for further work in this area for consideration by the Governing Council at its sixth session.

(d) Proposed Fund programme activities

197. The Executive Director proposes to support the following actions from the Fund of UNEP:

(a) Development of regional networks for human settlements technology (paragraph 188);

(b) Demonstration projects on improvement of marginal settlements in different regions (paragraph 189);

(c) Training of human settlements managers (paragraph 190);

(d) Support for training of physical planners and architects (paragraph 191);

(e) Guidelines for planners and managers (paragraph 192);

(f) Handbook on new settlements (paragraph 194).

2. Health of people and of the environment

(a) Human and environmental health

(i) Summary of the Level One overview 20/

198. Health is a basic human need and an integral aspect of the quality of life; it is influenced mainly by interaction between man and the biotic, chemical, physical and socio-economic factors in the human environment. The major causes of disease and death in developing countries are communicable faecal, air and vector-borne diseases aggravated by malnutrition. In developed countries they are chronic and non-communicable diseases, like cardio-vascular diseases and cancer, contributory factors being chemical, physical and socio-economic environmental hazards and self-imposed risks like cigarette smoking and improper diet; often these hazards are the side-effects of technological advance, industrial and agricultural expansion and the complexities of social life.

199. Control of communicable and non-communicable diseases may be best achieved by control of environmental factors and media. Environmental health management programmes should be an integral part of development programmes.

200. Many organizations are active in promoting environmental, including human, health. For example, WHO, FAO, ILO, UNESCO, UNDP, the World Bank and UNICEF are amongst the United Nations organizations, and OECD, CMEA, the International Agency for Research on Cancer (IARC) and IIASA among the intergovernmental and non-governmental organizations involved. 21/

201. Despite these activities, there are still major inadequacies in knowledge and action in the following areas: 22/

(a) Inadequacies in knowledge relating to:

- (i) Identification of environmental contaminants, diseases and other factors affecting man;
- (ii) Epidemiological methods to cope with environmental health problems;
- (iii) The etiology of some communicable and non-communicable diseases;

(b) Inadequacies in action:

- (i) Application of available technologies for intervention against communicable diseases;
- (ii) Cost-effective and reliable monitoring systems in developing countries to assess the extent of existing environmental health problems, including pollution, and collection of statistics on morbidity and mortality;
- (iii) National and international information systems to ensure proper compilation and dissemination of data, and early notification systems for emergencies and severe pollution;
- (iv) Legislation to control pollution; international conventions and guidelines on aspects of pollution and environmental health, including transfrontier pollution;

20/ For a detailed account of the overview, see UNEP Report No. 2, 1977.

21/ For a detailed survey of the activities of Governments, United Nations agencies and intergovernmental and non-governmental organizations, see UNEP Report No. 2, 1977.

22/ A more complete listing may be found in the Level One overview, Health of the People and of the Environment (UNEP Report No. 2, 1977).

- (v) Transfer of technology for rural water supply and waste disposal;
- (vi) Integration of environmental health programmes into development projects;
- (vii) Training and education at all levels in integrated environmental health programmes.

(ii) Objectives, strategies and concentration areas

202. The Governing Council endorsed the objectives and strategies in the area of human and environmental health at its third session, 23/ These have been summarized elsewhere. 24/

203. At its fourth session, the Governing Council agreed that the following parts of the programme for human and environmental health should be considered concentration areas:

- (a) Establishment of IRPTC (activities relating to this concentration area are dealt with under Earthwatch (paragraphs 92-101));
- (b) Support for the development of criteria for priority pollutants, giving guidance on levels of exposure consistent with the protection of human health and of non-human environmental targets.

(iii) Activities

204. Although the approved objectives and strategies for human and environmental health are of continuing validity, discussion with WHO, including a joint programming exercise in April 1976 and the Level One overview 25/ (paragraphs 199-201) indicate a need to place increased emphasis upon environmental methods of disease control. The activities for human and environmental health under Activity D reflect this new emphasis.

205. The activities are:

Activities within the concentration areas

Activity A (1977-1979) - The assessment of the impact of pollutants on man and the environment (total assessment) through:

- Studies on the relationship between exposure to pollutants and human and environmental health
- Review of pathways and transformation of pollutants from source to receptor (model case of sulphur oxides)
- Studies of, and in due course recommendation for, pollution control including economic and legal aspects (paragraphs 206-214).

Activity B (1977-1979) - Support for the protection of food and water from pollutants (paragraphs 215-217).

Activity C - Support for measures to provide protection from nuclear radiation (paragraphs 218-221).

Other activities

Activity D (1977-1979) - Support for activities in research and training aimed at obtaining suitable environmental tools for control of communicable and non-communicable diseases and methods for early detection of health deterioration caused by exposure to occupational health hazards (paragraphs 222-227).

23/ Decision 29 (III), para. 1.

24/ UNEP/GC/INFORMATION/1, sect. III.A. 1 (b) (i).

25/ FP/0107-76-02/Global/WHO/38,000/38,000/III'76-IX'76/GC/96.

Activity E (1977-1978) - Assessment of the correlation between pollution, nutritional status and housing conditions reflected by epidemiological data (paragraph 228).

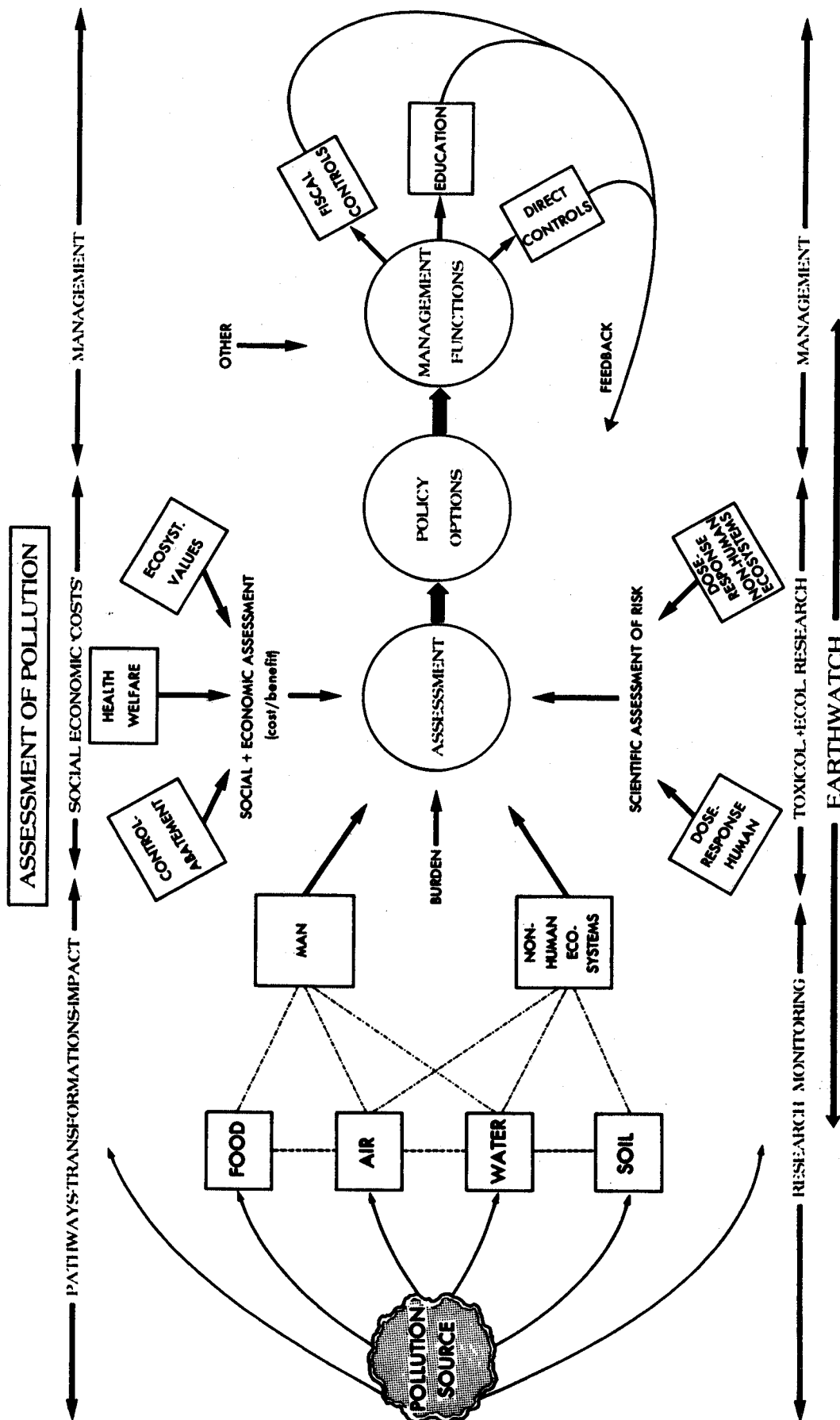
206. Activities within the concentration areas: Activity A - Comprehensive assessment of the impact of pollutants on man and his environment is important in promoting and assisting appropriate environmental management measures at the national and international level. An example of such management measures is the recent enactment by the United States Government of a Toxic Substance Control Act to protect human health and the environment from potentially toxic chemicals; similar legislation has been enacted in Sweden, Japan, Canada and other countries.
207. The total assessment of the impact of pollutants requires data on dose/effect relationships (criteria), environmental distribution of pollutants (pathways), and cost/benefit and other aspects of pollution control. (See also Figure 1 "Assessment of pollution").
208. In respect of dose/effect relationships, WHO has extended its programme of environmental health criteria documents; the publication of documents on eleven chemicals began in December 1976. In assisting WHO to accelerate this programme, 26/ UNEP was able to have factors included which are critical to the assessment of outer limits, e.g. fluorocarbons and ultra-violet radiation. The programme will continue into 1979, by which time criteria documents on thirty pollutants will have been issued. In 1976, WHO and UNEP published a manual on analytical procedures for evaluating toxicity of chemical pollutants. 27/
209. Closely related to the criteria programme are analyses of potentially carcinogenic substances undertaken by IARC and the Natural Resources Defense Council (NRDC) of the United States.
210. Similar criteria documents will be provided for the effect of chemicals on non-human targets. These are both biota, such as wildlife and vegetation, and buildings - including cultural monuments. Thus, this activity has implications for several other parts of the programme, such as human settlements, pest management systems, wildlife or living marine resources. But before substantive action can begin, the present state of knowledge about such impacts must be established. The breadth of total assessments of pollutants, ranging from the protection of plants, animals and structural materials to human health is illustrated by research programmes, such as that recently initiated in the Federal Republic of Germany on the effect of pollution on stained glass windows.
211. UNEP is collaborating with FAO in a preliminary review of the effect of pollutants on non-human targets as it relates to biota. 28/ An Intersecretariat meeting in February 1977 is expected to formulate proposals for activities by UNEP, FAO, UNESCO and other United Nations bodies, covering the period up to 1979.
212. Co-operation is envisaged with OECD for a programme on bio-accumulation of chemicals in food chains and the process of bio-degradation. Results of this programme should help in preparing criteria documents on human and non-human receptors.
213. Action in the second field, the environmental distribution of pollutants, is being implemented by MARC (see paragraph 56) through its review of the pathways of sulphur oxides as a model for similar total assessment studies in other pollutants. The outcome of this review is expected to be available by July 1977.

26/ FP/0107-75-10/Global/WHO/2,355,030/970,800/XI'75-XII'79/GC/61 and 96.

27/ FP/0107-75-04/Global/WHO/101,400/45,500/I'75-XI'76/GC/96.

28/ FP/0107-76-01/Global/FAO/45,200/34,700/X'76-III'77/GC/61 and 96.

Fig. 1



214. The third area is studies of pollution control, including cost/benefit aspects. Consultants from science, Government and Industry will review economic and legal implications of pollution control, including aircraft engine emission (ICAO), and their conclusions will be considered by a group of experts in 1978. This group will eventually develop guidelines for pollution control, using sulphur oxides as a model and utilizing the results obtained from other actions under this activity which should be available by 1980. In this way, assessment will lead to measures of environmental management.

215. Activity B - UNEP's action on control of food contamination is focussed on the needs of developing countries, where the problems of contamination of food and of food shortages, due to deterioration from such environmental factors as fungi, bacteria, insects, chemical and physical agents produce serious threats to human well-being.

216. Many international, governmental and non-governmental organizations are concerned with protecting food from contamination. For example, FAO and WHO have long-standing programmes in this field; WHO, through joint expert committees with FAO, evaluates the safety of food additives, pesticide residues and other contaminants and publishes the conclusions in the form of acceptable daily intakes, together with supporting toxicological data. Safety of food irradiation has been assessed by joint FAO/International Atomic Energy Agency (IAEA)/WHO expert committees. FAO has helped and is helping a number of developing countries to draft legislation and strengthen their infrastructure to protect food purity (Zambia, Qatar, Saudi Arabia, Kuwait, Mexico, Nigeria, Tunisia and Algeria). Similar assistance has been provided to Kenya and other East African countries in co-operation with UNEP.

217. UNEP is co-operating in supporting training programmes for the control of food contamination, particularly in East Africa (paragraph 580 (d)(i)), 29/ control of mycotoxins and aflatoxins 30/ in food (paragraph 226) and the FAO/WHO Codex Alimentarius Commission. 31/ These activities assist developing countries in implementing proper food control measures and protecting the consumer. Also relevant are activities in the field of microbiology (paragraphs 358-364).

218. Activity C - Radio-active pollution is treated separately from other pollution because the process of nuclear radiation is distinct, and the agencies involved in its surveillance and control differ from those concerned with other environmental pollutants.

219. The organizational responsibility for the secretariat of the United Nations Scientific Committee on the Effects of Atomic Radiation which gathers and assesses information on atomic radiation has been transferred to UNEP. 32/ The General Assembly at its thirty-first session noted with satisfaction the growing co-operation between the Scientific Committee and UNEP, particularly on projects to which the Committee could contribute, and requested UNEP to co-operate with the Committee in disseminating findings. UNEP and the Scientific Committee are also co-operating in the elaboration of dose/effect relationships (criteria documents) of selected radio nucleides.

29/ FP/0107-75-02/Africa/FAO-WHO/1,501,230/881,450/V1'76-X11'78/GC/61 and 96.

30/ FP/0107-75-01/Global/FAO/257,000/198,000/V1'75-X11'77/GC/96.

31/ FP/0107-75-06/Global/FAO-WHO/483,400/346,400/11'75-V1'78/GC/96.

32/ See Report of the Governing Council on the work of its fourth session: Official Records of the General Assembly, Thirty-first Session, Supplement No. 25 (A/31/25), paras. 460-466.

220. Support from UNEP to the International Commission on Radiation Protection (ICRP) has allowed the committee to produce a number of recommendations on radiation protection. ^{33/} ICRP's recommendations are the basis for national legislation in most countries and are used by international bodies, such as IAEA, ILO and WHO to devise their own recommendations or standards.

221. IAEA, in co-operation with UNEP, is carrying out a project on the long term management of high level and alpha-bearing radio-active wastes, ^{34/} including site selection factors for disposal of such waste in geological formations (see also paragraph 532).

222. Other activities: Activity D - In interpreting the Governing Council's mandate in human health, UNEP's role will continue to be to support the environmental aspects of disease control, mainly as a catalyst. UNEP already exerts a certain catalytic influence upon WHO and FAO's programme by ensuring that more attention is given to environmental intervention as a form of disease control. The action referred to below should be seen in that context.

223. Co-operation with WHO will continue on the basis of understandings arrived at in the joint programming exercise, ^{35/} in which several diseases were identified as amenable to control through environmental intervention. It also identified the importance of controlling occupational and work-related diseases through environmental intervention.

224. A joint FAO/UNEP/WHO consultation was held in Nairobi on the field control of the parasitic zoonoses known as taeniasis and hydatidosis (June 1976). ^{36/} It identified areas where environmental control programmes and field trials could start and proposed that guidelines and field trial manuals be prepared. A number of such actions are being implemented.

225. Cancer is another disease where environmental intervention offers the potential for improved control. ^{37/} A WHO/UNEP task force will be convened by IARC early in 1977 to examine environmental aspects of cancer control, and to ensure that these matters are given due recognition in IARC's priorities.

226. In connexion with training activities on the control of food contamination by mycotoxins and aflatoxins (FAO/UNEP) (see paragraph 217), a joint FAO/IARC/UNEP/WHO action on the control of aflatoxins and their effects on human health (liver cancer) is envisaged in early 1977.

227. In the area of occupational health, WHO and ILO are sponsoring programmes which involve early detection of health impairment due to occupational health hazards, guidelines for the control of hazardous work conditions and studies of permissible limits for exposure to harmful substances. These programmes will be taken into account at an expert consultation and in developing the programme in the field of industry and the environment (paragraph 455) and social outer limits (paragraphs 147-150).

228. Activity E - A co-ordinated study is to be undertaken in Bombay early in 1977 in co-operation with the Government of India and WHO. Its purpose is to develop methodology suited to the needs of developing countries to assess the interplay between epidemiological and environmental factors such as pollution. On the experience gained, a similar study may then be carried out in another city from a developing region.

^{33/} FP/0102-74-03/Global/ICRP/59,500/51,000/VII'74-III'77/GC/61 and 96.

^{34/} FP/0102-74-02/Global/IAEA/485,000/119,800 / VII'73-XII'76/GC/61 and 96.

^{35/} See UNEP/GC/89, annex I, paras. 5-6.

^{36/} FP/0405-75-03/Africa/Internal/47,000/47,000/IX'75-VI'76/GC/96.

^{37/} See also UNEP/GC/88 (State of the environment, 1977).

(iv) Proposed Fund programme activities

229. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Criteria documents on the effects of pollutants on human and non-human targets (paragraphs 206-211);
- (b) Review of the pathways of sulphur oxides (paragraph 213);
- (c) Expert group on the economic and legal aspects of pollution control (paragraph 214);
- (d) Support for actions to control food contamination (paragraph 217);
- (e) Co-operation with the United Nations Scientific Committee on the Effects of Atomic Radiation in production of criteria documents on selected radionuclides (paragraph 220);
- (f) Follow up activities to consultation on environmental control of parasitic zoonoses (paragraph 224);
- (g) Meeting on environmental elements in control of cancer (paragraph 225);
- (h) Activity to control aflatoxins (paragraph 226);
- (i) Consultation on occupational health hazards (paragraph 227);
- (j) Epidemiological study of Bombay (paragraph 228);
- (k) Management of high-level and alpha-bearing wastes (paragraph 221).

(b) Pest management systems

(i) Summary of the Level One overview 38/

230. Pest management systems are an aspect of health of people and of the environment to which UNEP has given special attention; they have therefore been the subject of a separate overview. Pest and vector control is essential to the health and nutrition of mankind. Vector control by chemicals has dramatically reduced death and ill-health due to vector-borne diseases. Plant protection enables food and fibre production to be increased, and better control of pests would reduce the losses in food (estimated at 20-30 per cent).

231. The large-scale application of chemicals has serious environmental side-effects. Careless use of pesticides may result in human disease and death, and damage or destroy other non-target organisms. Inadvertent destruction of parasites and predators and the development by the target organisms of resistance to pesticides may lead to rapid resurgence of the target pest and to the emergence of secondary pests. Some persistent pesticides accumulate in the environment and thus reach toxic concentrations in the food chain.

232. A more comprehensive approach to pest management is needed. Pest management systems should combine all relevant control techniques within the framework of the pest/host ecosystem, so as to produce favourable economic, ecological and social consequences. The following priority areas for the development of pest management systems have been identified:

- (a) Diseases: malaria, trypanosomiasis, schistosomiasis, filariasis;

38/ For a detailed account of the overview, see UNEP Report No. 2 (1977).

(b) Food crops: rice, maize/sorghum/millet, grain legumes, roots and tubers, vegetables;

(c) Special areas: cotton, rodents, stored product pests.

233. The main United Nations agencies involved in pest management activities are FAO, WHO, UNESCO and IAEA. 39/

234. The following major inadequacies in knowledge and action have been identified:

(a) Inadequacies in knowledge relating to:

- (i) Comprehensive methods of economic appraisal of pest management systems;
- (ii) Biological control techniques and environmentally sound uses of pesticides currently available;
- (iii) The short and long-term environmental effects of all control techniques;
- (iv) Pests and pest/man interactions, and the behaviour of individuals and communities in relation to pest management systems;
- (v) New pesticides, drugs, vaccines and chemo-therapeutic agents, and natural products for pest management;

(b) Inadequacies in action:

- (i) Adequate taxonomic and identification services; monitoring and information surveys for crop pests and public health vectors, especially in developing countries;
- (ii) Application of new scientific approaches to breeding resistant plants and animals;
- (iii) Transfer and exchange of information and research data at all levels involved in pest management work;
- (iv) Promotion of public participation and awareness in pest control;
- (v) Training and education to supply the manpower requirements of developing countries, in particular provision of: training courses at national and regional levels for non-professional staff; formal training courses, seminars and workshops for professional personnel; and under-graduate and post-graduate courses in the pest management approach, particularly in developing country universities;
- (vi) Co-ordination of activities at different levels to define and implement policies of pest and vector management, and to develop appropriate regulations and legislations.

(ii) Objectives, strategies and concentration areas

235. The Governing Council endorsed the objectives and strategies in the area of pest management systems at its third session. 40/ These have been summarized elsewhere. 41/

39/ For a detailed survey of the activities of Governments, United Nations agencies and intergovernmental and non-governmental organizations, see UNEP Report No. 2 (1977).

40/ Decision 29 (III), para. 1.

41/ UNEP/GC/INFORMATION/1, sect. III. 2 (b) (ii).

236. Also at its fourth session, the Governing Council agreed that the development of environmentally sound pest management systems should be a concentration area. 42/

(III) Activities

237. The activities, all of which fall in the concentration area are:

Activity A (1977-1980) - Implementation of action plans through demonstrations at the regional and national levels aimed at reducing the use of chemicals to ecologically safe levels, and pursuing other ecologically sound methods of pest control (paragraphs 239-241, 244 and 247).

Activity B (1977-1980) - Support for the research required to contribute to additional environmentally sound measures for pest and disease control (paragraphs 242, 245 and 248).

Activity C (1977-1980) - Training, education and information exchange on ecological methods in integrated pest management systems (paragraphs 243, 246 and 249).

238. Since the progress made in these activities differs for the three pests which the Governing Council has agreed should be given priority attention (i.e. schistosomiasis, malaria and cotton pests) separate descriptions are given for each pest. At a later stage attention will be given to similar activities relating to control of trypanosomiasis, filariasis and pests of food crops, as recommended in the overview on this subject (see paragraph 232).

Schistosomiasis

239. Activity A - A global plan for the bio-environmental control of this pest, prepared in co-operation with WHO, was made available to the Governing Council at its fourth session after approval by an international conference in Cairo. 43/ 44/ This plan, and the Level One review on pest management systems, 45/ provide an understanding of the problem, identify gaps in action and knowledge, and hence indicate what needs to be done.

240. Implementation of the action plan complements the programme of WHO, which has been engaged internationally for many years in efforts to control schistosomiasis and has periodically organized scientific reviews of techniques and results. The new WHO/UNEP Special Programme for Training and Research in Tropical Diseases has selected schistosomiasis as one of the diseases to be given intensified consideration. The implementation of the schistosomiasis plan includes promoting techniques of ecological management for incorporation in integrated control. This will be done through field actions to demonstrate a number of measures for the non-chemical control of schistosomiasis, emphasizing:

(a) Improvement of rural water supplies to minimize human contact with infected water sources and so interrupt the disease;

(b) Improvement of systems of human waste disposal;

(c) Systems to prevent contamination of water by the parasite's eggs;

(d) Destruction of the snail host through habitat modification and other ecologically sound measures.

241. The actions described in detail under Activity A in Water (paragraphs 335-340) will be used to demonstrate these measures in the field, to stimulate national involvement in environmentally sound forms of schistosomiasis control and to promote an awareness of the techniques internationally. Experience gained from the UNEP study tour to China in 1975 will also be drawn upon.

42/ UNEP/GC/57, para. 4 and decision 47 (IV), sect. 1, para. 3.

43/ UNEP/GC/INFORMATION/1.

44/ FP/0108-75-03/Global/Govt. of Egypt/321,600/91,437/111'75-X1'75/GC/61 and 96.

45/ FP/0108-76-01/Global/WHO/44,000/38,000/11'76-IX'76/GC/96.

242. Activity B - This will support research to fill the gaps in knowledge and verify principles of control as indicated in the action plan for schistosomiasis. This research, which will be carried out in co-operation with WHO and the WHO/UNDP special programme in tropical diseases, will examine bio-environmental methods of vector control and complement research in chemotherapy and immunology so as to help develop an integrated system of control. The co-operation of research foundations, including the Edna McConnell Clark Foundation, will be sought.

243. Activity C - It is intended to rely on the WHO/UNDP tropical diseases programme to develop the necessary training actions in environmentally sound forms of schistosomiasis control. These will be undertaken concurrently with the field demonstrations, i.e. from 1977 to 1980 (see Activity A).

Malaria

244. Activity A - A plan of action for the bio-environmental management of malaria was prepared by an intergovernmental meeting organized in co-operation with WHO in December 1975 in Lima, Peru; 46/ 47/ with the Level One review, this will provide a basis for Activity A. The recommendations of the action plan will be implemented as demonstrations of the integrated use of various measures to control malaria, focussing on environmental management and biological control as a complement to current control actions of WHO. In this activity there will be close co-operation with the WHO/UNDP tropical diseases programme, as well as with the International Centre for Insect Physiology and Ecology (ICIPE) Nairobi, Kenya.

245. Activity B - A review of the current state of knowledge of some tropical insects, including the abundance and density of man-biting malaria vectors, has been initiated with ICIPE. 48/

246. Activity C - In co-operation with WHO, FAO, ICIPE and others a training will be organized for technicians and professionals in integrated pest control systems and bio-environmental management.

Cotton pests

247. Activity A - The action plan drawn up by the UNEP/FAO intergovernmental meeting in Karachi, October 1975, 49/ on pest management systems for the control of cotton pests and the completion of the Level One review provide a basis for action. To implement the plan, two large-scale regional actions on integrated control of cotton pests are being undertaken with FAO in North Africa 50/ and in the Near East 51/ from 1977 to 1980, with substantial financial input from Governments and bilateral donors; these will demonstrate the benefits of incorporating environmental concerns into field actions.

248. Activity B - A recent economic and environmental study by the Central American Institute for Technical and Industrial Research (ICAITI) 52/ on the consequences of pesticide use in cotton production in Central America has emphasized the possibility of using an integrated approach to pest control which would reduce the amount of sprayed pesticide by about half, thereby minimizing pollution dangers, without affecting the crop yield. The results and technical data from the study will be used by UNEP and FAO to establish an intercountry programme on integrated control of cotton pests in Latin America (1978-1981).

46/ The plan is expected to be available by the time of the fifth session of the Governing Council.

47/ FP/0108-75-05/Global/WHO/111,700/93,700/VII'75-III'76/GC/61 and 96.

48/ FP/0108-76-02/Global/ICIPE/1,464,145/701,745/X'76-XII'78/GC/96.

49/ FP/0108-75-06/Global/FAO/93,550/68,300/IV'75-III'76/GC/61 and 96.

50/ FP/0108-76-04/Africa/FAO/1,849,184/150,000/I'77-XII'78/GC/61 and 96.

51/ FP/0108-76-03/Middle East and Asia/FAO/1,843,184/249,000/I'77-XII'78/GC/61 and 96.

52/ FP/0106-75-07/Latin America/ICAITI/240,450/167,500/V'75-IV'76/GC/96.

249. Activity C - Intercountry actions to be undertaken in co-operation with FAO will include training courses on non-chemical methods of pest control for extension officers and research workers. Within the co-operative UNEP/ICRPE activities, an element exists for training workers in the African region.

(iv) Proposed Fund programme activities

250. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Schistosomiasis: support of field actions, research and training (paragraphs 240-243);

(b) Malaria: support of field actions, research and training (paragraphs 244-246);

(c) Cotton pests: regional actions on integrated control (paragraphs 247-248), and training actions (paragraph 249);

(d) Other pests: support for preparation of plan of action for trypanosomiasis, filariasis and pests of important food crops (paragraph 238).

3. Major policy issues for the attention of the Governing Council

251. The Governing Council may wish to focus its policy discussion of this section principally on the following issues:

(a) The proposed revision of the objectives and strategies for human settlements in the light of the recommendations of the Habitat Conference and the outcome of the Level One overviews (paragraph 180);

(b) The arrangements for establishing regional networks of institutions to develop, apply and exchange information about environmentally sound and appropriate human settlements technologies (paragraph 188);

(c) The advisability of the continuation, in addition to work in the areas of concentration, of some actions in the control of communicable and non-communicable diseases through environmental intervention and control of occupational health hazards (paragraphs 222-227);

(d) The order of priorities in pest management systems as presented in the summary of the Level One overview (paragraph 232).

B. TERRESTRIAL ECOSYSTEMS

1. Introduction

252. The ecosystem is best considered as a total concept, and natural resources as its components. Soils, air, water, animals, plants and other genetic resources combine themselves to form ecosystems in which the fate of individual resources is bound up with that of others and of the ecosystem as a whole. Ecosystem problems can usefully be examined within the context of the ecosystem itself or by considering natural resources occurring widely in different ecosystems. At the same time, the intricacies of ecosystem function demand a highly specific and quantitative approach to the solution of problems brought about by imbalances in the system.

253. The structure of this section reflects both approaches. The ecosystems are discussed first (arid and semi-arid lands (formerly arid lands and grazing lands), tropical forests and woodlands and then mountains, islands, coastal and other ecosystems), followed by reports on individual resources of soils, water, and genetic resources. The section ends with the conservation of ecosystems in their natural condition and of individual species of fauna and flora; this account is combined under the title of Wildlife and protected areas, which thus replaces the two sub-sections previously used, Ecosystems, sites and samples, and Endangered species and wildlife.

254. The interdependence of ecosystems argues for treating conservation, protection and management of natural resources as essential parts of environmental management. In this context, UNEP supports research, advocates environmental management solutions to be implemented locally or nationally, and promotes integrated international policies and programmes. The activities in each sub-section of this priority subject area illustrate this approach.

2. Arid and semi-arid lands ecosystems

(a) Summary of the Level One overview 53/

255. Deserts, defined in climatic terms, cover about 36 per cent of the earth's land surface, or 43 per cent based on soil and vegetation data; the difference is accounted for by man-made deserts. About 12.8 per cent of the world's population live in desert areas. Although semi-arid grasslands provide rangeland for animals and are easy to cultivate, in their present state arid regions constitute at best a frozen asset for mankind. The prospects for expanded food production in arid and semi-arid regions will depend in large part on man's ability to stop desert creep, and to reclaim desert that was once productive.

256. Desertification is a world-wide process which has long been associated with man's misuse of land. Several forms of extensive land use, such as shifting cultivation, nomadism and seasonal grazing, have been maintained over centuries without destroying the ecosystem; however, when population pressure leads to rising demand for food and hence to more intensive land use, these traditional practices become increasingly destructive. Overgrazing, slash-and-burn, removal of tree cover for fuel and fodder and submarginal crop-land development are among the practices which cause soil erosion on an ever-wider scale, affecting the hydrology and generally lowering the productive potential of the arid and semi-arid regions. Moreover, the destruction of vegetation may directly affect the climate adversely, thus accelerating the process of desertification.

257. The United Nations Conference on Desertification to be held in August 1977 will highlight the problem and provide a valuable forum for exchange of experience and co-ordination of activities in this area. Current activities of the United Nations system regarding arid and semi-arid lands include research, the dissemination of information training and the application of existing knowledge. Among the members of the United Nations system most deeply concerned with the problems in this area are FAO, UNESCO and WMO. 54/

258. There are several major inadequacies in knowledge and action as follows:

(a) Inadequacies in knowledge relating to:

- (i) Climates and micro-climates of arid and semi-arid lands;
- (ii) Patterns of run-off, and management of ground water resources;
- (iii) The potential of non-conventional water resources, for example dew, sea water, and brackish water;
- (iv) Physical, microbiological and geochemical characteristics of arid and semi-arid zone soils;
- (v) Lithology of desert sands; processes of sand dune formation and movement;
- (vi) Flora and vegetation of arid areas; the significance of plants as indicators of habitat characteristics; the significance of land-use impact and/or of climatic trends; natural products of desert plants; drought and heat tolerance of desert animals; ecology and biology of soil fauna; and desert fauna as sources of human food;

53/ For a detailed account of the overview, see UNEP/PROG/2 (1975).

54/ For a detailed review of the activities of Governments, United Nations agencies, and intergovernmental and non-governmental organizations, see UNEP/PROG/1 (1975) and UNEP/GC/30.

(b) Inadequacies in action:

- (i) The establishment of an international network for information exchange on arid and semi-arid lands;
- (ii) Application of existing knowledge and technologies for integrated development of arid and semi-arid regions;
- (iii) Large scale public information and education programmes to encourage attitudes compatible with environmental requirements, and to build up technical and scientific infrastructures;
- (iv) Training in new methodologies for integrated studies, such as ecosystem modelling and the application of remote sensing data.

(b) Objectives, strategies and concentration areas

259. The objectives and strategies for arid and semi-arid ecosystems were approved by the Governing Council at its third session, 55/ and have been summarized elsewhere. 56/
260. At its fourth session, the Governing Council agreed that improving the productivity of arid and semi-arid ecosystems 57/ should be a concentration area.

(c) Activities

261. The activities, all of which fall within the concentration area are:

Activity A - Support for EMASAR, IPAL and field activities to control desert encroachment in the Sudan (paragraphs 262-267).

Activity B - Review of current activities leading to the formulation of other initiatives designed to combat desert encroachment and improve the productivity of arid and semi-arid ecosystems (paragraphs 268-269).

Activity C - Launching activities in rural energy, documentation and information exchange (paragraph 270).

Activity D - Promoting of manpower training (paragraph 271).

262. Activity A - EMASAR is a long-term, extensive FAO activity undertaken in co-operation with UNEP, which aims to promote national and regional activities to overcome the effects of drought, seasonal water shortages and over-exploitation in arid and semi-arid rangelands to achieve integrated resource development and management. Phase II, the first operational phase of this project which will take place in Africa and the Near and Middle East, was approved by FAO and UNEP in November 1976. 58/ To fulfil its objectives, EMASAR will use as an important resource the rangeland monitoring activities of GEMS (paragraphs 35-38), and the experience of MAB Project No. 3 as regards research and education.

263. By July 1977, EMASAR will submit two important studies which could be used as background documents for the Desertification Conference:

- (a) Information, education and training for the Sudano-Sahelian zone;
- (b) The forage plants of Africa.

55/ Decision 29 (III).

56/ UNEP/GC/INFORMATION/I, sect. III.B.1 (a) (i) and (ii).

57/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

58/ FP/1101-76-05/Africa, Near and Middle East/FAO/864,300/511,744/X'76-IV'78/GC/61.

264. Other EMASAR reports will contain recommendations on grazing lands development projects and the selection and breeding of fodder plants for arid zones, as well as a strategy on information, education and training for Africa and the Near and Middle East; these will be completed early in 1978. Proposals for activities on grazing land development for the Near and Middle East, and for Africa north and south of the Sahara (including the Sudano-Sahelian region), will be elaborated by EMASAR in the first half of 1978, taking into account the recommendations of the Desertification Conference.

265. IPAL, in which UNESCO is the lead agency, aims to identify the causes of ecological degradation and desert encroachment in the arid zones; document and measure the agents and processes of degradation; assess carrying capacities and management regimes compatible with the rehabilitation of degraded ecosystems; carry out experiments in, and demonstrations of rehabilitation management procedures; obtain baseline descriptions of arid and degraded ecosystems for ecological monitoring; and initiate such monitoring programmes. Phase II (the first operational phase) ends in March 1977. ^{59/} In collaboration with UNESCO, UNEP has prepared proposals for the further development of IPAL, by extending its geographical range and disciplinary scope; it is intended that IPAL should serve as a scientific back-up for all arid and semi-arid lands activities, including EMASAR.

266. Though IPAL and EMASAR complement each other in their activities, the two programmes differ in conceptual approach and implementation. EMASAR promotes awareness of the ecological problems facing man in arid zones, and encourages establishment of the infrastructure through which these problems can be tackled. It relies on techniques and information already available, but will be modified as new knowledge becomes available. IPAL, through integrated field activities, research, etc., identifies the major problems of the arid and semi-arid rangelands, the factors which are likely to contribute to the process of ecological degradation, the methods to be employed in arid zones, as well as a strategy on information, education and training (see also Activity D).

267. The third element of this activity, the control of desert encroachment in the Sudan, will include ecological management of water supplies; formulation of plans for alternative approaches to land-use in arid and semi-arid ecosystems; support for research into the functioning of these ecosystems and the processes of desert encroachment; training and education of the inhabitants in a better understanding of their environment; and promotion of the greatest possible participation in environmental conservation and management. The first phase involved assistance to the Government of the Sudan in preparing documentation for a "donors' meeting" to take place in March 1977. ^{60/} UNEP will participate in the donors' meeting, and will consider, in company with other United Nations organizations, how it can assist the Government in setting up a national unit for the control of desert encroachment and desert rehabilitation, and in drawing upon EMASAR for usable development and management technology and the integration of the numerous disciplines involved and upon IPAL and MAB Project No. 3 for scientific support and development of new information and technology.

268. Activity B - The future directions for the development of EMASAR, IPAL and the desert encroachment project in the Sudan will be elements in the review of completed, current and planned work which will be undertaken during 1977. This series, which will be completed after the Desertification Conference will take into account its outcome, and will also include the following:

- (a) The Level One review on arid and semi-arid lands;
- (b) The arid zones programme (UNESCO);
- (c) The International Hydrological Programme (IHP) of UNESCO;
- (d) FAO desertification, soil degradation and land evaluation programmes (especially the FAO programme on Present and Potential Land Use by Agro-Ecological Zones);

^{59/} FP/1101-76-03/Africa/UNESCO/413,800/375,000/IX'75-III'77/GC/61 and 96.

^{60/} FP/1101-76-04/Africa/National Council for Research - Sudan/101,380/87,350/VI'76-X'76/GC/61 and 96.

- (e) FAO forestry programmes;
- (f) Human resources, institutions and programme reform case studies (FAO);
- (g) Regular animal production programmes (FAO);
- (h) MAB Project No. 3 objectives and programmes (UNESCO);
- (i) The programme of the International Livestock Centre for Africa (ILCA).

269. The review is expected to identify a few well-focussed lines of action for UNEP in the area of arid and semi-arid ecosystems. These will need to be balanced between short-term emergency initiatives and long-term activities and between the needs of different regions, and will be developed with clear phasing. It is likely that training (see Activity D) will be given more emphasis in the future development of those lines of action.

270. Activity C - UNEP will co-operate with the relevant United Nations organizations to launch the following three actions:

(a) Firewood and substitutes 61/

This action will cover two oil-producing countries and two Sudano-Sahelian ones. Its objectives are to promote better use of existing resources by planned exploitation of forests and improved charcoal processing, to encourage substitution of oil products for wood in countries which are poor in forests but rich in oil, to create new resources by planting trees for fuel, and to study in collaboration with the rural energy centres (see paragraphs 535-537) the practicability of using non-conventional energy resources. UNEP is currently designing a study on the subject in consultation with the countries concerned and with FAO; work is expected to begin by the end of 1977. This action will closely relate to plans for the trees programme (see paragraphs 288-290).

(b) Institut du Sahel

A meeting took place on 6 to 10 December 1976 at ministerial level between the member States of the Permanent Inter-State Committee on Drought Control in the Sahel to consider the establishment, location and terms of reference of the proposed Institute. UNEP is preparing, concurrently with UNDP, the United Nations Institute for Training and Research (UNITAR), UNESCO, FAO, WMO, WHO and other agencies, to participate appropriately in the Institute as well as in the complementary activities of the "Club des amis du Sahel", 62/ sponsored by the Belgium, France and the United States of America.

(c) Arid zones ecological documentation centres

The objectives are: to establish co-operation between users in order to determine priorities in the field of information and its transfer; to train staff; to make a survey of available resources in the region; to determine the future data bank; and to identify the types of records, resources identification, techniques and staff required. UNEP has participated in several preparatory meetings in Mendoza, Argentina, for the establishment of a centre there. 63/ Further consultations are planned during the first part of 1977, and, in the light of these and the outcome of the Desertification Conference, action to establish the centre is expected to begin towards the end of 1977 in co-operation with UNESCO and ECLA. Another centre may be established in the Middle East to perform similar functions; discussions on this are in hand with UNESCO.

61/ For a fuller description of the problem of firewood, see UNEP/GC/88.

62/ "Club des amis du Sahel" is an organization whose concerted effort over a long-term period aims at restricting the harmfulness of an eventual drought and to improving the quality of life in the Sahelo-Sudanian zones. Every country which is a member of the Permanent Inter-State Committee is a de jure member.

63/ FP/0206-74-04/Latin America/IADIZA/UNESCO/49,300/16,300/IV'74-11'75/GC/32.

271. Activity D - The success of EMASAR, IPAL, the Sudan desert encroachment control project and other activities will depend on the availability of well-trained manpower and citizen participation. Thus all activities in this sub-area of the programme have a strong component of education and training. Experience and knowledge gained through these activities will be used to formulate other initiatives to increase training, information and extension services covering such areas as land-use reforms, improved range management, water distribution, soil conservation and livestock management.

(d) Proposed Fund programme activities

272. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Components of EMASAR and IPAL (paragraphs 262-266);
- (b) Desert encroachment control in the Sudan (paragraph 267);
- (c) Action on firewood and substitutes (paragraph 270 (a));
- (d) Support for the Institut du Sahel (paragraph 270 (b));
- (e) Documentation centres in Latin America and the Middle East (paragraph 270 (c));
- (f) Training programmes (paragraph 271).

3. Tropical woodlands and forests ecosystems

(a) Summary of Level One overview 64/

273. Tropical forests are estimated to cover an area of about 3,050 million hectares. Their chief economic value lies in timber production and the use of plants and animals for food, drugs and breeding. Tropical forests are also important to the environment because they have for millions of years played a major role in certain geochemical cycles, e.g. carbon dioxide and water, and in the build-up and maintenance of soil fertility.

274. In recent years, the impact of man on the humid tropics has entered a new phase because of large-scale lumbering and tree monoculture, conversion to grassland for cattle, construction of roads and air-strips, intensified hunting, and herbicide spraying. If present trends continue and conservation efforts are not greatly increased, most of the tropical forests will be destroyed or replaced by simpler communities by the end of the century.

275. Although a number of actions 65/ dealing with the environmental aspects of tropical forests and woodlands are being undertaken by several United Nations agencies (for example by FAO, UNESCO and WMO) and by some non-governmental organizations (for example by the International Union for Conservation of Nature and Natural Resources (IUCN)), there are several major inadequacies in knowledge and action:

- (a) Inadequacies in knowledge relating to:
 - (i) The effects of tropical forests on the atmosphere and water regime;
 - (ii) The nutrient cycle in natural and artificial forests, and soil changes following the conversion of forest to other types of land use;
 - (iii) Animal (including insect)/plant relations in tropical forest ecosystems;

64/ For a detailed account of the overview, see UNEP/PROG/2 (1975).

65/ For a detailed survey of the activities of Governments, United Nations agencies, and intergovernmental and non-governmental organizations, see UNEP/PROG/1 (1975) and UNEP/GC/30.

- (iv) The minimum self-maintaining area of forest;
- (v) Agricultural systems suitable for tropical forest areas;
- (b) Inadequacies in action:
 - (i) Monitoring changes in tropical forests caused by environmental factors, including social and human impacts; and of changes in climate and soils caused by deforestation;
 - (ii) Dissemination of information on the development, rational use and conservation of natural resources of tropical woodlands and forests;
 - (iii) Development of education and training programmes on the ecology, conservation and rational use of tropical forests.

(b) Objectives, strategies and concentration areas

276. The Governing Council approved the objectives and strategies for tropical woodlands and forests at its third session 66/ and modified the strategies in respect of trees at its fourth. 67/ The approved objectives and strategies have been summarized elsewhere. 68/

277. At its fourth session, the Governing Council agreed that two activities under tropical woodlands and forests should be concentration areas:

(a) Encouraging programmes of scientific research and pilot projects in integrated tropical ecology, and developing guidelines for the ecologically sound management of tropical woodlands and forests, and conservation of threatened life within these systems;

(b) Promotion of a world-wide programme for the protection and planting of trees. 69/

278. Also at its fourth session, the Council requested the Executive Director to take the necessary measures, in co-operation with UNESCO and FAO, to launch a practical programme, in the form of pilot projects, for the promotion of applied and appropriate studies and research and for the training of the specialists essential to rational use of the African tropical rain-forest. 70/

(c) Activities

279. The activities are:

Activities within the concentration areas

Activity A (1977-1982) - Updating and regionalization of knowledge of tropical woodlands and forests (paragraph 280).

Activity B (1977-1982) - Establishment of field pilot projects to test the application of existing knowledge about ecologically sound forms of management (paragraphs 281-286).

Activity C - Research to fill gaps in knowledge (paragraph 287).

Activity D (1977-1982) - Promotion of a world-wide programme of tree planting and protection (paragraphs 288-290).

Activity E - Promotion of manpower training to implement integrated and ecologically sound management practices (paragraph 291).

66/ Decision 29 (III).

67/ Decision 50 (IV), para. 5 (a).

68/ UNEP/GC/INFORMATION/1, sect. III.B.1 (b) (i) and (ii).

69/ UNEP/GC/57, para. 4 and decision 47 (IV), sect. I, para. 3.

70/ Decision 54 (IV).

Other activities

Activity F - Monitoring important biological factors affecting the long-term stability of tropical woodlands (paragraph 292).

Activity G - Promotion of a global network of information exchange and utilization of other means to disseminate knowledge and information (paragraph 293).

(i) Activities within the concentration areas

280. Activity A - This activity was in large part served by the review prepared for the third session of the Governing Council, 71/ which is summarized above (paragraphs 273-275). In collaboration with UNESCO and IUCN, further reviews have been undertaken and will be published during 1977. Thereafter, periodic up-dating will take advantage of the information made available to FAO through its Committee on Forestry, the reviews which might be undertaken through the MAB activities of UNESCO, the studies of the International Development Research Centre (IDRC), and the occasional papers available from the International Union of Forestry Research Organizations (IUFRO). The World Forestry Congresses, organized under the auspices of FAO, provide suitable occasions for a comprehensive review and up-dating of current knowledge.

281. Activity B - Pilot field schemes are to be established to test the applicability of available knowledge to ecologically sound management of tropical woodlands and forests. By the end of 1977, UNESCO and UNEP will have co-operated in establishing pilot projects in Africa, 72/ Latin America and South-East Asia; FAO is expected to be fully associated with these projects and they would be co-ordinated with any relevant developmental activities of UNDP.

282. Both in its MAB programme and in its other regular activities, 73/ UNESCO's interest and competence in tropical woodlands and forests focus on scientific research and the training of specialists (see also Activities C and E). The descriptive phase of the MAB programme in which UNEP assisted, is complete and work during the period 1977-1982 will focus mainly on the implementation of MAB Project No. 1: The ecological effects of increasing human activities on tropical and sub-tropical forest ecosystems, and MAB Project No. 8: The conservation of natural areas and of the genetic material they contain. 74/

283. Forests are also of great importance to FAO, which is to concentrate on six major areas, 75/ three of which relate closely to the UNEP strategy: (a) tropical forestry development; (b) conservation; and (c) forestry institutions. The FAO Committee on Forestry noted that while it was urgent to develop forestry industries, many gaps in applicable knowledge remained, in spite of recent scientific and technological advances. For these and other reasons, the experience of pilot activities undertaken with UNESCO will supplement and reinforce rather than duplicate FAO's activities.

284. Several other actions are planned which illustrate specific aspects of environmentally sound management of tropical woodlands and forests, and will be taken into account in the pilot projects. The development of alternative management practices in tropical woodlands and forests will be encouraged. Agrisilviculture - a method of raising forest crops in combination with agricultural ones - is one of these alternatives. Proposals are now under discussion with FAO which will result in the establishment of pilot projects to demonstrate this approach; the first project is expected to be operational by 1978. IDRC organized a technical and planning meeting on this subject in Paris in November 1976 to lay down an action plan; the outcome of activities in the IDRC plan will provide useful experience. Activities based on agrisilviculture can be excellent demonstrations of the importance of the concept of ecodevelopment (paragraphs 406-408). A number of centres in the Consultative Group on International Agricultural Research (CGIAR) system have programmes on alternative cropping strategies which are relevant to this activity.

71/ UNEP/GC/30 and UNEP/PROG/2.

72/ In the case of Africa, this proposal represents the Executive Director's response to Governing Council decision 54 (IV).

73/ See documents 19C/4 and 19C/5 of the nineteenth session of the UNESCO General Conference.

74/ FP/1102-76-01/Global/UNESCO/1,828,000/1,143,000/1977-1980/GC/96.

75/ See document COFO-79/9 of the FAO Committee on Forestry; July 1976.

285. Conservation, which is an important element of ecologically sound management of tropical forests, is given considerable attention in the sub-section on genetic resources 76/ (paragraphs 351-371).

286. IUCN, ICSU, through SCOPE, and the International Association for Ecology (INTECOL) all promote actions relevant to the attainment of this part of the environment programme. IUFRO provides excellent facilities for an international exchange of knowledge and information. WMO and the Centre for Natural Resources, Energy and Transport, United Nations Department of Economic and Social Affairs also have relevant expertise.

287. Activity C - In the context of MAB activities, regional expert meetings have been convened to examine research priorities for the management of tropical woodlands and forests: Kuala Lumpur, August 1974; Mexico City, September/October 1974; Kinshasa, September 1975; and Varanasi, India, October 1975. 77/ The pilot field activities (Activity B) will apply the existing knowledge and enable the design of well-focussed and management-oriented research to fill gaps in knowledge. Experience gained will be used to prepare manuals and guidelines to ecologically-sound management practices to be issued by 1981.

288. Activity D - The "Trees" programme is relevant to several other programme areas apart from tropical woodlands and forests, such as other sub-areas of terrestrial ecosystems, GEMS, human settlements, energy and natural disasters. A global programme for using forests and trees to stabilize and improve the human environment has been elaborated. Its main objectives are to safeguard and rehabilitate the natural vegetation cover so that it can fulfil its many functions, e.g. soil conservation and improvement of hydrological conditions and of the microclimate in agricultural and pasture systems, contribute to general ecological equilibrium and the maintenance of a varied gene resource pool and serve as a source of renewable energy especially for poor rural communities. The programme requires a broad interdisciplinary approach which acknowledges that degradation and destruction of trees are not so much due to a lack of understanding of their importance, but rather to forces such as the need for fuel and for new land to grow food or provide fodder for livestock.

289. The programme will identify four geographical areas of priority for international action:

(a) Non-irrigated, arid and semi-arid lands in the tropical, sub-tropical and Mediterranean climatic zones;

(b) Important mountainous watersheds, with steep slopes, dominating densely populated fertile valleys, piedmonts and alluvial plains;

(c) Areas affected by extensive land and settlement development projects which entail replacement of natural ecosystems by man-made ecosystems with a fundamentally different man-made landscape;

(d) The humid tropical forest belt.

290. In each of these priority areas one representative country will be selected for the elaboration and implementation of an integrated action plan. At the same time, the opportunity will be used to organize special studies, training courses, seminars and study tours for decision-makers and technicians of other countries with similar conditions. The four national action plans will be prepared and undertaken jointly with national authorities, local populations, international organizations, governmental as well as non-governmental, and bilateral and multilateral aid organizations. UNEP will act as initiator, catalyst and co-ordinator of the activities in the four selected test countries, and will ensure that each example is used to the full for international research, training, education and public information.

76/ FP/1102-75-05/Global/FAO/777,000/328,000/III'75-XII'77/GC/32, 61 and 96.

77/ FP/0202-73-03/Latin America/UNESCO/81,800/35,200/XII'73-XII'74/GC/23, FP/1102-75-04/South Asia/UNESCO/87,000/62,000/IV'75-XII'77/GC/52 and 96, FP/1102-75-01/Africa/UNESCO/78,700/57,700/III'75-XII'75/GC/32 and 68.

291. Activity E - One of the most serious obstacles to the adoption of sound management practices is the lack of trained specialists, especially in developing countries. The training of competent professionals will be undertaken with the full co-operation of FAO and UNESCO in the course of implementing the field projects described under Activity B. 78/

(ii) Other activities

292. Activity F - As part of GEMS, trends in tropical forest cover will be monitored with a view to taking the necessary corrective steps 79/ (paragraphs 35-38).

293. Activity G - The pilot projects on (Activity B) ecological management of tropical woodlands and forests will give prominence to disseminating information to the public and policy-makers. Although regional meetings, international conferences, symposia, seminars and workshops promote information dissemination and exchange, the long-term aim is to create a system for information exchange; this will, of course, require considerable resources and careful planning, and action may not begin until 1983.

(d) Proposed Fund programme activities

294. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Pilot field projects in Africa, Latin America and Asia (including research and training) (paragraphs 281-287 and 291);

(b) Improved agricultural systems suitable for tropical forest areas (e.g. agrisilviculture and the research of the CGIAR system) (paragraph 284);

(c) Promotion of a world-wide programme for the protection and planting of trees (paragraphs 288-290).

4. Mountain, island, coastal and other ecosystems

(a) Objectives, strategies and concentration areas 80/

295. The objectives and strategies for ecosystems other than arid, semi-arid, tropical woodlands and forests were endorsed by the Governing Council at its third session 81/ and have been summarized elsewhere. 82/

296. This has not been defined as a concentration area by the Governing Council, but most actions that have taken place or are planned relate closely to activities undertaken in defined concentration areas.

(b) Activities

297. The activities are:

Activity A (1977-1979) - Review of the ecological status of high mountains and preparation of regional plans for mountains (paragraphs 298-299).

Activity B (1979 onwards) - Convening regional workshops and intergovernmental meetings to adopt these regional plans for mountains, and co-operation with Governments in implementing them (paragraph 300).

Activity C (1977-1981) - Ecological surveys of island and coastal ecosystems to promote the restoration, conservation and ecologically based management for sustained productivity of these ecosystems (paragraph 301).

78/ FP/1102-75-04/South Asia/UNESCO/187,000/162,000/IV'75-XII'77/GC/32 and 96;
FP/1102-76-01/Global/UNESCO/1,828,000/1,143,000/I'77-III'80/GC/96.

79/ FP/1102-75-005/Global/FAO/1,058,000/557,000/IX'75-III'78/GC/61.

80/ No Level One overview has been prepared for this sub-area.

81/ Decision 29 (III).

82/ UNEP/GC/INFORMATION/I, sect. III.B.1 (c) (i) and (ii).

Activity D - Promotion of a convention on conservation of certain islands for science (paragraph 302).

Activity E - Education, training and information programmes in the conservation and management of mountain, island and coastal ecosystems (paragraph 303).

(i) Mountains (Activities A and B)

298. Activity A - A number of organizations and Governments are involved in assembling data about mountain ecosystems. UNEP and UNESCO, working closely with the MAB National Committees in the Andean region, ^{83/} give priority to human settlements, land-use alternatives, migration, tourism, alternative sources of energy, new approaches to the exploitation of resources and ecodevelopment. UNESCO and the MAB Committees in Central Asia have assembled data for that region. IUCN has been gathering information from scientists involved in high mountain ecology and conservation.

299. Nevertheless a number of gaps in knowledge remain, and a comprehensive review of information on mountains, emphasizing tropical and sub-tropical regions, will be published in 1978 by IUCN with the co-operation of UNEP. As part of this exercise, the mountain review (UNEP/IUCN) ^{84/} is being up-dated, taking into account the Andean work referred to above, the outcome of the UNESCO/MAB Regional Meeting on the Central Asian Mountains (Kathmandu, September/October 1975), the International Workshop on the Development of the Mountain Environment (Munich, December 1974) convened by the Foundation for International Development of the Federal Republic of Germany, and the Final Report of the Working Group on UNESCO/MAB Project No. 6: Impact of human actions on mountain and tundra ecosystems. Drawing on this review, regional plans of action will be prepared in 1979 by UNEP in co-operation with FAO, UNESCO, IUCN and others; these plans will contain proposals for ecologically sound management of mountain regions, giving special attention to such issues as water, energy, tropical forests and training, and including field action.

300. Activity B - Will begin in late 1979, and will involve regional workshops to discuss and refine the draft plans before they are submitted for adoption by regional intergovernmental meetings. Thereafter priority will be given to co-operating with Governments in implementing the plans.

(ii) Island and coastal ecosystems (Activities C and D)

301. Activity C - Current or planned actions concern the following:

(a) Galapagos Islands: UNESCO, FAO, IUCN and the Charles Darwin Foundation have been involved in this scientifically unique island group. UNEP has prepared an outline of research and conservation priorities for the archipelago which is related to the Master Plan for the Galapagos National Park. ^{85/} UNEP will support a mission to the Galapagos for discussions with the Government of Ecuador in 1977, in order to explore how to implement this plan;

(b) Other island groups: the wise management of island ecosystems and coastal areas will be encouraged by UNEP in the context of actions in the Mediterranean, the East Asian Seas and the Red Sea (paragraphs 493-504 and 510-513) and the Caribbean and South Pacific (paragraphs 659-660);

(c) Management advice: with the United Nations Department of Economic and Social Affairs, FAO, UNESCO, IUCN and others, guidelines will be prepared for the management of island and coastal ecosystems to ensure their conservation and sustained productivity.

^{83/} FP/1105-75-02/Latin America/UNESCO/156,450/101,650/VIII'75-VII'76/GC/61 and 62.

^{84/} RA/1103-75-04/Global/IUCN/3,028,500/1,555,000/V'75-XII'77/GC/61 and 62.

^{85/} FP/0605-74-01/Global/Internal/297,781/I'74-V'77/GC/61, 62 and 96.

302. Activity D - Involves provision for the further development of a draft convention on the conservation of certain islands for science, originally prepared by IUCN. As a basis for the elaboration of this convention, UNESCO, FAO, IUCN and UNEP will identify certain small, remote, relatively undisturbed and sparsely inhabited islands which could be designated as "islands for science". The initial phase of this goal, covering the Pacific, the Indian Ocean and the Caribbean, will end in 1979 with proposals for an intergovernmental meeting to review a draft convention.

(III) Education, training and information (Activity E)

303. Activity E, which is general to mountain, island and coastal ecosystems, will be achieved through education, training and information programmes in the conservation and management of such ecosystems in collaboration with FAO, UNESCO, MAB and Governments concerned. It will also be linked with other similar actions described elsewhere in this section (see, for example, paragraph 291).

(c) Proposed Fund programme activities

304. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Review of mountain ecosystems and development of regional plans of action (includes Phase II - Andean Project) (paragraph 299);

(b) Ecological surveys of island and coastal ecosystems and the preparation of ecological guidelines (paragraph 301);

(c) Development of a convention on the conservation of certain islands for science (paragraph 302);

(d) Education, training and information programmes (paragraph 303).

5. Soils

(a) Summary of the Level One overview 86/

305. Soil forms a biogeochemical shell over the earth, acts as a global accumulator and distributor of energy obtained through photosynthesis and retains the most important biophilic elements.

306. Misguided human action has contributed greatly to the destruction and degradation of soils. The total area of destroyed and degraded soils is estimated at 20 million sq km, which is more than the entire area used for arable agriculture at present (14-15 million sq km). Soil degradation has become, therefore, of paramount importance from the standpoint of the production of food and biological raw materials, and of the functioning of the biosphere in general.

307. Several United Nations organizations have been deeply concerned with the problems of soil loss, in particular FAO, UNESCO, WMO and the World Bank. The United Nations Desertification Conference will be an important forum for the exchange of knowledge and co-ordination of activities about soil loss and fertility restoration. 87/

86/ For a detailed account see document UNEP/PROG/2 (1975). The overview deals mainly with soil loss. The up-dated version which will be presented to a future session of the Governing Council will include other aspects of soils. See also UNEP/GC/88.

87/ For a detailed review of the activities of Governments, United Nations agencies and intergovernmental and non-governmental organizations see documents UNEP/PROG/1 (1975) and UNEP/GC/30.

308. There are major inadequacies in knowledge and action as follows:

(a) Inadequacies in knowledge relating to:

- (i) The economic and biological potential of soils and changes taking place in this potential;
- (ii) Technologies for recultivation and utilization of degraded soil;

(b) Inadequacies in action:

- (i) Preparation of improved international soil policy guidelines for use at the national level including development of legislation to promote proper land utilization and soil conservation;
- (ii) Refinement of guidance on eliminating activities which induce soil degradation and on increasing crop yield through the application of environmentally sound agricultural technologies;
- (iii) Co-operation by national and international institutions in accelerating soil assessment, including the monitoring of soil degradation and losses;
- (iv) Education and training programmes in soil ecology and conservation, ecosystem management and techniques of soil assessment at all levels, particularly for decision-makers, technologists and land users.

(b) Objectives, strategies and concentration areas

309. The objectives and strategies for soils were endorsed by the Governing Council at its third session, 88/ and have been summarized elsewhere. 89/

310. At its fourth session, the Governing Council agreed that developing the means to arrest destruction of soil should be a concentration area. 90/

(c) Activities

311. The activities are:

Activities within the concentration area

Activity A (1977-1978) - Contributions to global and regional assessments of soil degradation and erosion (paragraphs 312-317).

Activity B (1978-1980) - Action to demonstrate how to combat soil erosion and degradation (paragraphs 318-319).

Activity C - Dissemination of knowledge about ways of restoring the fertility of soil degraded by mining (paragraphs 320-321).

Activity D (1977-1981) - Assistance in the development of techniques to restore, maintain or increase soil fertility through new agricultural practices (paragraph 322).

Activity E (1977-1981) - Actions to demonstrate how fertility can be restored, maintained or increased by non-polluting means of soil fertilization, and in particular the promotion of increased use of biological and organic sources of soil fertility (paragraph 323).

88/ Decision 29 (III).

89/ UNEP/GC/INFORMATION/1, sect. III.B.1 (f) (i) and (ii).

90/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

Other activities

Activity F (1977-1980) - Promotion of training and education activities as integral components of soil actions (paragraph 324).

(i) Activities within the concentration area

312. Activity A - FAO, UNESCO and the International Society of Soil Sciences (ISSS) have long been active in assessing soil quality and degradation. For example, FAO, with assistance from UNESCO and ISSS, is preparing and publishing a soil map of the world (at a scale of 1:5,000,000) in 19 sheets, together with explanatory regional brochures; it also publishes a more detailed soil map of Europe. UNESCO is preparing a map of salt-affected soils. Numerous other international and national bodies are concerned with aspects of soil degradation.

313. Nonetheless important gaps remain in the assessment of soil degradation and erosion. Therefore UNEP is co-operating with FAO and UNESCO ^{91/} to initiate a global assessment of existing and potential soil degradation by compiling available data and interpreting the impact of environmental factors on soil degradation processes. The resulting information will be used to determine the most vulnerable areas of the world, in which action should be concentrated. These actions are carried out in close collaboration with GEMS (see paragraphs 40-42).

314. Also relevant to this activity is the co-operation between UNEP, IFIAS and the State Committee for Science and Technology of the Council of Ministers of the Union of Soviet Socialist Republics, through the USSR Academy of Sciences, in organizing a workshop on soil problems at Samarkand in June 1976. ^{92/} Discussions will be held in mid-1977 with IFIAS, FAO and other bodies to consider how to follow-up on this workshop, and to relate the resulting actions to the outcome of the FAO/UNESCO world assessment of soil degradation. A component of this action, emphasizing economic aspects, will be incorporated into field demonstrations to combat soil erosion and degradation as part of Activity E.

315. FAO, UNESCO and WMO have reviewed the present state of knowledge on the impact of climate on soil erosion, but some gaps in understanding remain. UNEP plans to assist in measuring the erosive effects of rainstorms in selected environments of 25 tropical countries. This work, which has been carried out by the International Institute of Tropical Agriculture (IITA) on behalf of CGIAR will be closely co-ordinated with the field activities of FAO.

316. Other actions which will fill gaps in knowledge are:

(a) Co-operation with UNESCO and the International Association for Hydrological Sciences to improve understanding of the effects of siltation by rivers emptying into the Mediterranean, ^{93/} especially the impact of contaminated material on water quality;

(b) Collaboration with UNDP and FAO in its efforts to deal with problems of salinization and waterlogging in Egypt. ^{94/} Training of experts and technicians from other developing countries facing similar problems will be associated with this work.

317. Two proposed actions are:

(a) A review of the environmental impact of various sand-dune fixation techniques and of means of arresting soil erosion in arid areas (this review will draw on the study tour to China in 1975 which examined the techniques of dune stabilization);

^{91/} FP/1106-75-05/Global/FAO/UNESCO/1,005,300/541,500/VI'75-V'78/GC/61.

^{92/} FP/1106-76-02/Global/IFIAS/125,000/109,500/XI'75-XI'76/no doc.

^{93/} FP/1106-75-06/Regional/UNESCO/IAHS/64,000/47,000/X'75-IV'77/GC/62.

^{94/} FP/1106-75-01/Regional/FAO/2,824,932/135,432/VII'75-I'77/GC/62.

(b) Participation in the analysis of the impact on the environment and soil fertility of tree monoculture. It is expected that FAO and other relevant organizations will play a part in this action, which will be integrated with related actions in arid and semi-arid lands and tropical woodlands and forest ecosystems.

318. Activity B - Drawing on the results of the activities noted above (paragraphs 312-317), management-oriented demonstration activities will be undertaken in co-operation with FAO and with the participation of other international bodies.

319. The stages of this process will be:

(a) From 1978, a number of demonstration actions will be planned and initiated under a single umbrella project;

(b) By 1981, results from these actions will permit the publication of guidelines for Governments, agencies and others dealing with soil erosion, degradation and fertility loss;

(c) These actions will be followed by a co-ordinated effort at the national and regional levels to promote sound soil management.

320. Activity C - UNEP is co-operating in several actions designed to help restore the productive capacity of land which has been mined:

(a) A study by the Department of Economic and Social Affairs of the restoration of the productive capacity of mined areas in South East Asia, ^{95/} especially through techniques of consecutive mining and reclamation. The results of this study will be available early in 1978;

(b) An ECE symposium at Katowice (Poland) ^{96/} in October 1976 on the environmental problems associated with the coal industry, at which the following topics were given special attention:

- Land reclamation after open-cast mining
- Removal, reclamation and utilization of waste heaps
- Damage, including subsidence, caused by mining
- Treatment of mine water.

321. It is proposed to organize seminars and workshops in a developed country or countries for mining technicians and decision-makers from developing countries, to assist developing countries in reclaiming derelict land for productive purposes. These actions, the details of which will be worked out in the coming year, will be undertaken with the support of other parts of the United Nations system, notably the Centre for Natural Resources, Energy and Transport and ECE.

322. Activity D - An important aspect of UNEP's actions is to promote the use of environmentally sound agricultural technologies in raising crop yields. UNEP is co-operating with IITA on research into mixed cropping and its role in maintaining soil fertility, especially in tropical countries. ^{97/} Also relevant are a number of actions relating to the use of micro-organisms (paragraph 362 (a)) and the studies on biogeochemical cycles (paragraphs 143-146).

323. Activity E - FAO, in co-operation with UNEP and with financial support from the Swedish International Development Agency (SIDA), organized in 1974 an expert consultation on organic materials as fertilizers, which recommended more research into the effects of organic materials on soils and into new sources of soil fertilization to prevent soil destruction. The following actions

^{95/} FP/1106-74-001/Regional/UN/ESA/232,000/197,000/1'75-X11'77/no doc.

^{96/} FP/1106-76-01/Regional/Poland/z1 1,062,818; \$15,600/z1 486,219; \$15,600/X'76/no doc.

^{97/} FP/1106-76-03/Regional/IITA/2,660,000/510,000/1'76-X11'78/GC/62.

have been drawn up with that recommendation in mind:

- (a) Promotion of the application of rhizobia in agriculture (see paragraph 362 (a));
- (b) Encouragement to the use of waste materials to improve soil fertility (see paragraph 362 (b));
- (c) Assessment of other possible sources of organic fertilizers, such as algae.

(ii) Other activities

324. Activity F - Training and education components have been and will continue to be incorporated in activities wherever possible. Special attention will be given to using the field actions to provide training in new field techniques of controlling soil erosion and enhancing soil fertility.

(d) Proposed Fund programme activities

325. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Erosive effects of tropical rainstorms and related activities of the CGIAR network (paragraph 315);
- (b) Effects of suspended materials borne by rivers (paragraph 316);
- (c) Problems of salinization and water logging (paragraph 316);
- (d) Sand dune fixation (paragraph 317 (a));
- (e) Soil management, demonstration project (paragraphs 318-319);
- (f) Training on land reclamation and management after mining activities (paragraph 321);
- (g) Effect of agricultural practices to soil fertility (paragraph 322);
- (h) Use of non-chemical fertilizers, especially organic materials (paragraph 323);
- (i) Training component as applicable in above actions (paragraph 324).

6. Water

(a) Summary of the Level One overview 98/

326. Water is a renewable resource distributed by the hydrological cycle. It is an indispensable ingredient for survival. Man's many water requirements vary according to geographical and socio-economic factors; each kind of water use has its own quality requirements. Population growth and economic and industrial development have led to an increase in per capita demand for water, and to water quality degradation as a result of waste disposal.

327. The number of pollutants threatening water quality is constantly increasing. Pollutants can be dissolved or suspended, and may be chemical, thermal or biological in nature. The most important are synthetic organic compounds, heavy metals, and biodegradable organic compounds which not only affect the local water supply but may also contribute to the global problem of marine pollution through river discharges into the sea. Water quality is also seriously affected by infective or parasitic diseases.

328. Water resources development is closely related to development activities of wider scope, e.g. agricultural development, industrialization, urbanization, soil preservation and energy production. Major water resources projects have important consequences for public health, social and economic structures, public administration and climate, which go beyond the direct benefits of water use.

98/ For a detailed account of the overview, see UNEP/PROG/2 (1975).

329. The multiple purposes for which water is needed and its major importance in development have made water an area of concern for many international organizations, such as FAO, WHO, UNICEF and UNESCO. ^{99/} Among intergovernmental organizations, CMEA, OECD, the European Economic Community (EEC) and others are dealing with problems of water supply, sanitation and water quality assessment. The Final Act of the Conference on Security and Co-operation in Europe specifically envisages co-operation in the prevention and control of water pollution, in particular in transboundary rivers and international lakes.

330. Several inadequacies exist in knowledge and action:

(a) Inadequacies in knowledge relating to:

- (i) The development of environmentally sound, effective prospecting methods for ground-water resources, particularly in developing countries;
- (ii) Systematic techniques for analysis of water requirements;
- (iii) The effects of water pollution and the means of preventing it;
- (iv) Systems of water management and water quality monitoring;
- (v) Environmentally sound and appropriate technologies for water treatment and disposal;

(b) Inadequacies in action:

- (i) The establishment of an international network of research and development institutions, with associated arrangements for information exchange, possibly linked to a world reference centre;
- (ii) Provision of specialized training programmes for water quality managers, construction technicians, mechanics, civil engineers, etc.;
- (iii) Development of information to the public at large about water quality and the proper economic use of available resources.

(b) Objectives, strategies and concentration areas

331. The objectives and strategies for water were endorsed by the Governing Council at its third session. ^{100/} However, in light of the decision of the Council at that session that UNEP should be concerned with water resources as well as water quality, ^{101/} a revised strategy was presented to the fourth session, and approved then. ^{102/} The approved objectives and strategies are summarized elsewhere. ^{103/}

332. Also at its fourth session, the Governing Council decided that two elements should be concentration areas:

(a) Enhancement of the quality and quantity of rural water supplies, while avoiding damage to the environment and undesirable side effects on human health;

(b) Support for the establishment of training centres for water resources management. ^{104/}

^{99/} For a detailed survey of the activities of Governments, United Nations agencies and intergovernmental and non-governmental organizations, see UNEP/PROG/I (1975) and UNEP/GC/30.

^{100/} Decision 29 (III).

^{101/} Decision 31 (III).

^{102/} Decisions 50 (IV), para. 5 and 55 (IV), para. 2.

^{103/} UNEP/GC/INFORMATION/I, sect. III.B.1 (g) (i) and (ii).

^{104/} UNEP/GC/57, para. 4 and decision 47 (IV), sect. I, para. 3.

333. At the same session, the Council requested the Executive Director to continue to participate actively in the preparations for the United Nations Water Conference. 105/

(c) Activities

334. The activities are:

Activities within the concentration areas

Activity A (1976-1980) - Promotion of improved water availability through prevention of water quality deterioration by ecologically sound measures, encouragement to search for additional sources of water, and efficiency in utilization, by field actions in Africa, Asia and Latin America (paragraphs 335-340).

Activity B (1976-1980) - Promotion of education and training in water resources management, including on-the-job training and support for the establishment of an international training centre (paragraph 341).

Other activities

Activity C (1976-1977) - Contribution to the preparations for the United Nations Water Conference to assist the participation of developing countries, and further support for the development of system-wide water actions in the United Nations (paragraphs 342-344).

Activity D (1976-1980) - Demonstration of environmentally sound methods of water resources management and development through field actions and support for co-operative investigations and actions in the management of African lakes and of river basins shared between countries (paragraphs 345-348).

Activity E (1977-1979) - Demonstration of the protection of water sources from eutrophication and promotion of the rehabilitation of eutrophied waters in an industrialized country to serve as field training in water protection and conservation (paragraph 349).

(1) Activities within the concentration areas

335. Activity A - The use of water for disposal of human, industrial and agricultural wastes continues to be the chief limit to clean water supply. Many United Nations organizations have contributed to the protection of water sources and the provision of safe rural water supply and satisfactory disposal systems. For example, in 1973, over 52,000 wells were constructed as part of UNICEF's rural water supply actions; UNICEF programmes continue to emphasize improving rural water quality and protecting springs to enhance water resources. Since its establishment, WHO has taken many initiatives to improve the quality of human waste disposal systems in urban and rural areas. For the period 1978-1983, WHO intends to give support to basic sanitation, with emphasis on rural areas and the unserved fringes of cities. The extensive actions of UNESCO in hydrology include those relating to pollution problems and the rational management of water resources in rural areas. Many of these actions are co-ordinated through the Ad Hoc Working Group on Rural Potable Water Supply and Sanitation, in which UNEP participates.

336. Additional actions under Activity A are intended to complement the work of WHO, UNICEF, UNESCO and other agencies, 106/ and to promote the application of sound ecological principles, including re-use, to waste disposal. In both respects, actions in the area of water relate closely to those in pest management systems, where emphasis has been laid on safe waste disposal and water supply systems as a means of controlling schistosomiasis (see paragraphs 239-243).

337. These actions will be implemented during the period 1976-1980 through field demonstrations in co-operation with UNICEF and WHO, and possibly with UNESCO, UNDP and the World Bank. There will be five phases: the collection of information, implementation, mid-term review, completion and evaluation of field actions, and preparations for national follow-up.

105/ Decision 55 (IV).

106/ FP/0208-74-01/Global/WHO/330,000/70,000/IX'76-V'77/GC/32 and 96.

338. Projects to demonstrate the relevance of satisfactory waste disposal and safe water supply to the control of schistosomiasis will be mounted in a number of countries in Africa, Asia and Latin America. The demonstrations will draw on local expertise, using appropriate and local technologies where feasible and encouraging their widespread adoption. Since an adequate supply of clean water also contributes to the control of enteric and other diseases, this action helps attain other objectives under human health. The choice of countries will depend on the seriousness of sanitation and schistosomiasis problems, whether conditions in the country lend themselves to demonstration actions, the willingness of the country to be involved, and the facilities available. The first field demonstrations are being planned in Swaziland.

339. Another element of Activity A is encouragement of the wider application in developing countries of existing knowledge of rain and storm water collection and storage. The first phase will be the collation of available information, much of which has been accumulated through the experience of FAO, other United Nations agencies and bodies, national institutions and individuals. Data collected will relate to quality of water collected, the impact of rain and storm water on soil erosion (see paragraph 315), and various technologies for collection and storage. Following the evaluation of this information during 1977 and 1978, demonstration projects will be implemented in co-operation with UNESCO, FAO, UNICEF and possibly the World Bank.

340. In rural areas, small water impoundments are often, despite the attendant health hazards, the principal sources of water supply. A component of Activity A will demonstrate how to make small impoundments safe by preventing human and animal contact with the water by fencing, promoting alternative water supply, controlling aquatic weeds (for example by harvesting them for commercial use), and modifying shorelines. Field activity during the period 1977-1980 will be initiated in Africa, and later extended to Asia and Latin America. Countries for the demonstration sites will be selected after information has been gathered and evaluated with the participating agencies, UNESCO and WHO, and possibly FAO, UNDP and the World Bank; following the completion of the activity, evaluation and preparation for national follow-up will take place. In designing the field demonstrations, regard will be had to the measures and proposals in the action plan on ecological and habitat control of schistosomiasis. 107/

341. Activity B - Training in water resources management is urgently needed, and the various field actions referred to above, especially those in developing countries, will be used for this purpose, as well as to promote awareness amongst the general public of water problems and the need for ecologically sound solutions. The experience of UNESCO, especially with visual aids, will be of great assistance in respect of training. It is also intended to co-operate with the Government of France in establishing a water management training institute which will provide training programmes to participants from various parts of the world, especially developing countries.

(ii) Other activities

342. Activity C - UNEP has provided financial support for the preparation of documents for the regional preparatory meetings of the United Nations Water Conference in the ECLA, ESCAP, ECWA, and ECA regions. 108/ Assistance was given to developing countries to help meet the costs of travel by their delegations to the regional preparatory meetings and, in accordance with a request of the Governing Council, 109/ financial support will also be provided to ensure full participation by developing countries in the Conference itself in 1977. UNEP contributed to the background documents for the Conference, so as to ensure that the environmental aspects of water are taken into account. There will be two UNEP documents: on eutrophication and the rehabilitation of eutrophied waters, 110/ and on environmental issues in river basin development. 111/

107/ UNEP/GC(IV)/Inf.1.

108/ FP/1107-75-04/Global/UN/ESA/612,000/265,000/VII'75-IV'77/GC/32, 62 and 96.

109/ Decision 55 (IV), paras. 3 (b) and (c).

110/ E/CONF.70/A.20.

111/ E/CONF.70/A.26.

343. In accordance with the decision of the Governing Council, 112/ water was the subject of World Environment Day 1976, and the interest created by that event should help focus public attention on the Water Conference (see also paragraphs 598-599).

344. UNEP has supported 113/ an interagency working group to prepare a water programme for the United Nations system. A report of the group examines water activities undertaken by the system, identifies overlaps and gaps, recommends assistance to countries in the areas of water supply and waste disposal, water use in agriculture and industry, environmental protection, etc., and emphasizes the need to understand the long-term effects of water pollution. Action to be taken will depend upon the outcome of the Water Conference.

345. Activity D - Water management, through the construction of dams and irrigation systems, has been promoted by the World Bank, UNDP and FAO. WHO has been involved in related health problems and UNESCO assists with training aspects. The ECE water programme embraces water pollution prevention and control and water supply and use problems. Taking these initiations into account, Activity D is intended to promote consideration of environmental concerns in water management in three ways.

346. The first component relates to the development, under the auspices of WMO and UNDP, of a mathematical model of the basin of Lakes Victoria, Kyoga and Mobutu Sese Seko; this forms part of a larger joint venture involving UNDP and the Governments of Burundi, Egypt, Kenya, Rwanda, Sudan, Uganda, and the United Republic of Tanzania. In planning the management of the water of the Upper Nile basin. A feasibility study of the inclusion of environmental factors in the WMO/UNDP model will end early in 1977. Thereafter it is expected that UNEP will participate in the development of a water quality component (1977-1978) which will ensure that environmental consideration are taken account of in development plans for the basin. Further UNEP participation in the overall planning of the regulation and use of the Nile will be identified in 1978, in co-operation with WMO, FAO, the Centre for Natural Resources, Energy and Transport, UNDP and the World Bank.

347. The second component, which is still at an early stage of negotiation, includes a contribution to a UNDP project for the development of the Senegal Basin to ensure that environmental factors receive attention. Two field actions are also under consideration in Europe: protection of the quality of water resources in the Danube basin and co-operation with UNESCO to support an environmental study on the Tejo river basin in Portugal.

348. The major problems in irrigation are inefficiency in the transport of water and the adverse effects which accompany its use. As a third component of Activity D, it is intended to collaborate with UNESCO and MAB, and possibly FAO, to elaborate a programme of field actions to demonstrate efficient water management in large-scale irrigation schemes in different climatic areas and to include provision for training. It is likely to extend over four years: an initial phase of information gathering, leading to the choice of countries and sites, design of field actions in line with the recommendations of the UNDP/COWAR (Scientific Committee on Water Research)/SCOPE/MAB symposium on the environmental effects of arid lands irrigation, implementation, and finally evaluation. 114/

349. Activity E - Eutrophication of water is a serious problem. As a sequel to the eutrophication symposium held in the German Democratic Republic in September 1976, which was attended by participants from 34 countries, and in implementation of the symposium recommendations, 115/ it is intended to draw on the relevant experience of European countries, ECE and OECD to promote a field demonstration of rehabilitation in the ECE region and to use this for on-site training, especially for people from developing countries.

112/ Decision 55 (IV), para. 3 (b).

113/ FP/1107-76-01/Global/Internal/24,000/24,000/IV'76-IX'76/GC/32, 62 and 96.

114/ FP/1101-75-06/Global/UNESCO/COWAR/SCOPE/183,500/112,000/III'75-XI'76/GC/61 and 96.

115/ FP/1107-75-03/Global/GDR/512,600/227,200/VI'75-XII'76/GC/61 and 96.

(d) Proposed Fund programme activities

350. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Continued support to the Ad Hoc Working Group on Rural Potable Water Supply and Sanitation (paragraph 335);

(b) Demonstration of rural water supply and ecologically safe waste disposal (paragraph 338);

(c) Demonstration of rain and storm water harvesting and storage (paragraph 339);

(d) Demonstration of protection of small water impoundments (paragraph 340);

(e) Support for the International Training Centre for Water Resources (France) (paragraph 341);

(f) Support for follow-up activities of the United Nations Water Conference (paragraphs 342-344);

(g) Inclusion of environmental aspects on mathematical model of African lakes and the Nile basin (paragraph 346);

(h) Protection of environmental safety in river basins including those in Senegal and Portugal (paragraph 347);

(i) Demonstration of efficient water management of large-scale irrigation schemes (paragraph 348);

(j) Demonstration of rehabilitation of eutrophic surface waters (paragraph 349).

7. Genetic resources

(a) Summary of the Level One overview 116/

351. Since the advent of scientific breeding only four generations ago, new plant varieties, breeds of animals and strains of micro-organisms have been and are being developed in response to the needs of modern intensive production systems. Varieties created by man tend to lose the specific qualities obtained by breeding. The limited gene pool of a few advanced varieties and breeds can, given high inputs, produce high yields at a given time on a given site, but it also limits their use as gene pools for further improvement through breeding. The insurance represented by the very rich natural gene pool, with its lower vulnerability to pests and disease, should be conserved; in fact it is being lost at an ever increasing rate.

352. The extent to which genetic resources are used by man varies greatly according to the type of material: crop plant, forest, farm animal, wildlife, fish and microbiological genetic resources and the species concerned. FAO and UNESCO (through MAB) are the United Nations agencies most involved in conservation of genetic resources. 117/ CGIAR, through its International Board for Plant Genetic Resources, is now the most important source of finance for programmes on plant genetic resources; UNDP has financed some relevant activities at CGIAR centres. Among non-governmental organizations, the International Committee on Taxonomy of Viruses (ICTV) and the International Cell Research Organization (ICRO) are particularly active in this field.

353. The following major inadequacies in knowledge and action have been identified (for wildlife genetic resources, see the summary of the Level One overview for Endangered species and wildlife (paragraphs 376-379):

(a) Inadequacies in knowledge relating to:

(i) More efficient exploitation of microbial genetic resources, particularly in the developing world, to control and avoid disease, pollution and waste disposal;

116/ For a detailed account of the overview, see UNEP/PROG/4 (1976).

117/ For a detailed survey of the activities of Governments, United Nations agencies and intergovernmental and non-governmental organizations, see UNEP/PROG/3 and 5 (1976) and UNEP/GC/60.

- (ii) The efficiency of crop plant genetic conservation, the preservation of "recalcitrant" seeds and seed storage at very low temperatures;
- (iii) Forest plant seed storage and testing of species in tropical, sub-tropical, mediterranean and arid zones;
- (iv) Genetic qualities of fish;
- (b) Inadequacies in action:
 - (i) High-quality microbiological culture collections on a regional level in less developed areas;
 - (ii) Collection of diverse crop plants, appropriate conservation of seeds, especially in South East Asia, Central America and Africa, and indexing of inventories of reserves;
 - (iii) Measures to improve the protection of forest reserves and the exploration, collection and evaluation of new species and provenances;
 - (iv) Preservation of farm animal breeds in developing countries;
 - (v) Conservation techniques for fish genetic resources and guidelines for the exchange of exotic species;
 - (vi) Training programmes to improve conservation expertise;
 - (vii) International and regional networks to collect and exchange information and research data on all aspects of genetic resources.

(b) Objectives, strategies and concentration areas

354. The objectives and strategies for genetic resources were endorsed by the Governing Council at its third session 118/ and have been summarized elsewhere. 119/

355. At its fourth session, the Governing Council decided that support for measures to conserve genetic resources, in particular the development of a network of microbiological resources centres for micro-organisms, especially rhizobia, should be a concentration area. 120/

(c) Activities

356. The strategies approved for genetic resources by the Governing Council at its third session were the same for all aspects of genetic resources activities. However, with experience in the implementation of those strategies and in light of the decision to concentrate particularly on microbiological genetic resources, it is apparent that the same effort cannot be applied to all types of resources. Thus a fuller account is given for actions on microbial resources than for the other genetic resources; In respect of those animal genetic resources represented by endangered species and wildlife, the actions are pursued through activities reported on in that section (paragraphs 382-392).

357. The activities are:

Activities in microbial genetic resources (concentration area)

Activity A (1977-1982) - Support for, and participation in the work of the UNEP/UNESCO/ICRO Panel on Microbiology (paragraph 358).

118/ Decision 29 (III).

119/ UNEP/GC/INFORMATION/I, sect. III.B.1. (e) (i) and (II).

120/ UNEP/GC/57, para. 4 and decision 47 (IV), sect. I, para. 3.

Activity B (1977-1980) - Assistance in the preparation and issue of catalogues of important microbial strains (paragraph 359).

Activity C (1977-1982) - Promotion of a network of microbiological resource centres (paragraphs 360-361).

Activity D (1977-1982) - Promotion of the application and use of micro-organisms in the solution of environmental problems (paragraphs 362-363).

Activity E - Training of manpower, especially in developing countries, to promote the application of microbiology in environmentally sound solutions of development problems (paragraph 364).

Activities in other genetic resources

Crop genetic resources

Activity F (1977-1982) - Support for and participation in the work of the International Board of Plant Genetic Resources (IBPGR) (paragraph 365).

Activity G (1977-1982) - Support for the preparation and issue of reports on the status of the genetic resources of important crop plants, and promotion of their conservation (paragraph 365).

Activity H (1977-1982) - Training of manpower to collect, evaluate, document, conserve and utilize crop genetic resources (paragraph 365).

Forest genetic resources

Activity I (1977-1982) - Encouragement for the preparation and issue of reports on the status of the genetic resources of important forest plants, and promotion of their conservation (paragraphs 366-367).

Activity J (1977-1979) - Promotion of a co-ordinating mechanism for forest genetic resources conservation activities (paragraph 367).

Animal (including fish) genetic resources

Activity K (1977-1982) - Support for the preparation and issue of reports on the status of the genetic resources of important animal resources, and promotion of their conservation (paragraph 368).

Activity L (1977-1978) - Pilot action on the methodology of conservation of fish genetic resources (paragraph 370).

(1) Activities in microbial genetic resources

358. Activity A - In view of the rapid strides being made on many fronts in this subject, UNEP convened a meeting of experts in 1974 to examine whether such advances could play a useful role in the solution of environmental problems. The report of the experts indicated that micro-organisms played a key role in the environment and were potentially valuable tools of environmental management; subsequently, the panel on microbiology was reorganized and expanded to become the UNEP/UNESCO/ICRO Microbiology Panel, ^{121/} which co-ordinates activities in the non-medical aspects of the subject. UNEP will continue its active role in the activities of the Panel, together with UNESCO, FAO and other interested parties.

^{121/} See "International Scene, the UNEP/UNESCO/ICRO Program in Microbiology", reprinted ASM News, Vol. 43, No. 1, January 1977. FP/1108-75-03/Global/UNESCO/2,098,800/1,233,200/VII'75-VI'79/GC/61 and 96.

359. Activity B - UNESCO, in association with the section on Culture Collections of Micro-organisms of the International Association of Microbiological Societies (IAMS) and the World Federation of Culture Collections (WFCC), has supported the preparation of Inventories, directories and other information about collections of cultures of micro-organisms, and an international registry of microbial genetic stocks; in addition, an earlier work is available on collections of rhizobium which was produced under the auspices of the now defunct International Biological Programme (IBP). These catalogues, directories and stock lists are now to be continuously updated and made widely available with the help of computerized facilities at the Data Centre at the University of Queensland, Brisbane, Australia, with which UNEP is co-operating. 122/

360. Activity C - One of the most important activities is the establishment of a network of microbiological resources centres in all the regions of the developing world to enable them to make the best use of micro-organisms.

361. The first four centres will be established on a pilot basis in 1977, in association with UNESCO and FAO, in South East Asia, the Arab States, Latin America and Eastern Africa to deal with microbial resource conservation (culture collections) and biological nitrogen fixation. 123/ They will be linked with a few strategically placed institutions in advanced countries in order to facilitate the flow and exchange of knowledge and technology. Their performance will be reviewed in 1980 and a decision taken then on subsequent activities.

362. Activity D - The following are examples of the application of micro-organisms to the solution of environmental problems:

(a) FAO, in co-operation with UNEP, is carrying out preliminary assessment in selected countries of Africa and Latin America of the possibilities of biological fixation of atmospheric nitrogen by micro-organisms. 124/ IITA is looking at ways of improving the nitrogen contribution from legume rhizobia to crops and soil fertility in the humid tropics. 125/ UNDP is supporting similar work at the International Rice Research Institute (IRRI). The International Centre of Tropical Agriculture (CIAT) at Cali, Colombia also promotes the more efficient use of symbiotic nitrogen fixation. The microbiological resource centres (paragraphs 360-361) in the African and Latin American regions will permit the isolation, culturing and development of improved rhizobia strains for use in these regions;

(b) Micro-organisms can be used in waste recycling and utilization, as sources of energy, in integrated pest management systems and in microbial protein production from natural and waste products. UNEP co-operates in these fields with ICRO, ICSU, the Royal Swedish Academy of Sciences, IFIAS, WFCC, ICIPE, UNITAR, and the United Nations University, as well as with UNESCO and FAO. The UNEP/FAO seminar on the use of agricultural wastes, held in January 1977, recommended the establishment of pilot projects to demonstrate the great potential of waste utilization in developing countries (see also paragraphs 450-451).

363. While the value of micro-organisms has been recognized and greater efforts are being made to promote their use, ethical and other problems posed by genetic engineering and DNA recombination have recently begun to surface. The UNEP/UNESCO/ICRO Panel on Microbiology (paragraph 358) has an Advisory Committee on Biotechnology and Applied Microbial Genetics which keeps abreast of developments and draws attention to issues for further consideration. Recently, ICSU has established a Scientific Committee on Recombinant DNA Research (SCORD), with which UNEP will keep in touch.

122/ FP/0604-74-01/Global/UNESCO/54,000/35,500/IX'74-VIII'75 and also within FP/1108-75-03/GC/40.

123/ FP/1108-75-03/Global/UNESCO/2,098,800/1,233,200/VII'75-VI'79/GC/61 and 96.

124/ FP/1108-75-07/Global/FAO/202,000/130,000/XII'75-XII'77/GC/61 and 96.

125/ FP/1108-75-06/Global/CGIAR/IITA/2,900,000/235,000/X'75-X'77/GC/61 and 96.

364. Activity E - UNEP, UNESCO and ICRO have collaborated in co-ordinated training activities in microbiology. During 1975/1976 training courses and workshops in various aspects of this subject were held in Egypt, Guatemala, India, Indonesia, Mexico, the Philippines and Thailand. 126/ This programme will be intensified and accelerated to ensure that developing countries are self-sufficient in this subject. Annual training courses will be formulated for Africa, Latin America and Asia, the effectiveness of which will be enhanced by the establishment of the microbiological resource centres.

(II) Activities in crop genetic resources (F, G, H)

365. The International Board for Plant Genetic Resources (IBPGR) is charged with creating a network of genetic resources centres as a means of conserving crop genetic resources. UNEP, FAO and UNDP are co-operating in the work of the Board. 127/ Advantage has been taken of the existence of the specialized centres of the CGIAR system to promote the conservation of genetic resources of rice (IRRI) and legumes (IITA and CIAT). Other crops such as maize, wheat and sorghum are on the priority list for action. The training of manpower to carry out these activities is important and UNEP has collaborated with FAO and IBPGR in promoting training.

(III) Activities in forest genetic resources (I, J)

366. FAO's Panel of Experts on Forest Gene Resources keeps the state of the genetic resources of forest plants under review and FAO publishes "Forest Genetic Resources Information" which contains useful information. IUFRO also issues relevant information, as do other non-governmental organizations, such as the Sierra Club, which has, in co-operation with UNEP, completed a study of the forests of Venezuela.

367. With the co-operation of FAO, actions are under way for in situ conservation of forest ecosystems and ex situ conservation of selected species in planted stands in Africa and Asia. 128/ An evaluation of progress will be made by mid-1978 to project the next round of actions. UNEP has also collaborated with IUCN to prepare a strategy for ecosystems development and conservation. Tropical woodlands and forests are an important part of this strategy. Relevant also to this strategy is MAB Project No. 8: the conservation of natural areas and of the genetic material they contain. Biosphere reserves for forests have now been established in South East Asia, in which UNEP collaborates. Experience in the conservation of plant genetic resources indicates the need to strengthen co-ordinating mechanisms, exchange of information and transfer of experience. Such a strengthened mechanism for forest resources would improve international, regional and inter-country co-operation. If forestry is not a priority area of action for CGIAR, FAO and UNEP, in co-operation with other organizations, will have to explore alternative arrangements for co-ordination of this work.

(iv) Activities in animal genetic resources (K, L)

368. In co-operation with UNEP, FAO undertook a pilot assessment of the world-wide needs for the conservation of animal genetic resources which has led to the initiation of field activities, which will involve FAO and UNEP in the conservation of prolific tropical sheep, criollo cattle of Latin America, trypanotolerant cattle of West Africa, endangered sheep breeds of the Mediterranean countries of Europe, and possibly buffalo in the Near East and Asia. 129/

126/ FP/1108-75-03/Global/UNESCO/2,098,800/1,233,200/VII'75-VI'79/GC/61 and 96.

127/ FP/1108-76-01/Global/CGIAR/IBPGR/2,416,000/200,000/III'76-XII'77/GC/61 and 96.

128/ FP/1108-75-05/Global/FAO/777,000/328,000/X'75-VI'78/GC/61, and 96.

129/ FP/1108-76-02/Global/FAO/366,000/296,610/X'76-IV'79/GC/61 and 96.

369. Since priority has been given to other resources, action has been delayed on the genetic resources of fish which were, however, identified as needing evaluation, documentation and conservation in the overview presented to the Governing Council at its fourth session (paragraph 353 (a) (iv) and (b) (v)).

370. It is now proposed to undertake a preliminary review of the status of the genetic resources of fish with a view to preparing, by the time of the sixth session of the Governing Council, a plan for their conservation. FAO will play a leading role in the formulation and execution of this plan.

(d) Proposed Fund programme activities

371. The Executive Director proposes to support the following actions from the Fund of UNEP:

- (a) The work of the UNEP/UNESCO/ICRO Microbiology Panel (paragraph 358);
- (b) Creation of microbiological resource centres (paragraphs 360-361);
- (c) Annual training courses and seminars of the Microbiology Panel, CGIAR and FAO (paragraph 364);
- (d) The work of IBPGR (paragraph 365);
- (e) Conservation of forest genetic resources (paragraph 367);
- (f) Conservation of important breeds of animals and the formulation of plan on fish (paragraphs 368-370).

8. Wildlife and protected areas

(a) Summary of the Level One overview

(1) National parks and reserves ^{130/}

372. Rising population and economic expectations have led to increased exploitation of ecosystems. Natural ecosystems face a wide variety of problems resulting from man's impact. The areas most vulnerable to change and ill-advised development have been the tropical and sub-tropical forests and grasslands, high mountains, tundra regions, wetlands, coastal and estuarine regions, mangrove and coral reef systems, and oceanic islands.

373. There is a growing desire to maintain part of the earth's ecosystems in a natural or semi-natural state as national parks or reserves, because such samples have enormous scientific, educational, cultural, aesthetic, recreational and economic value. While protected samples of many ecosystems now exist, these are still far from being fully representative (including Greenland and Antarctica, about one per cent of the earth's surface is so protected). Moreover, in some of the "protected" areas the adverse impact of agriculture, mineral exploitation, poaching, tourism, etc. are serious.

374. The United Nations agencies most deeply involved in ecosystems conservation are UNESCO and FAO, both individually, jointly and in association with UNEP and UNDP. ^{131/} Prominent among non-governmental organizations are IUCN and the World Wildlife Fund (WWF).

^{130/} For a detailed account of the overview, see UNEP/PROG/4 (1976).

^{131/} For a detailed survey of the activities of Governments, United Nations agencies, and intergovernmental and non-governmental organizations, see UNEP/PROG/3 and 5 (1976) and UNEP/GC/60.

375. The following major inadequacies in knowledge and action require particular attention:

(a) Inadequacies in knowledge relating to:

- (i) Resource management in various ecosystems;
- (ii) Conditions and trends in environmental features of national parks and other protected areas;

(b) Inadequacies in action:

- (i) The urgent establishment of new national parks and protected areas in ecosystems where they do not exist;
- (ii) International assistance for the enactment and enforcement of appropriate national legislation;
- (iii) The utilization of representative natural ecosystems as baseline areas in monitoring;
- (iv) Training and education programmes, especially in developing countries, to provide increased information to the general public; teaching of ecological principles in pre-university levels; support to relevant university courses and research activities; and training courses on the management of national parks.

(ii) Endangered species and wildlife ^{132/}

376. Wildlife - including all animals and plants occurring in the wild state - is of profound significance to human survival, as an economic, nutritional or cultural resource, as an indicator of environmental health and as a component of ecosystems.

377. Man's principal negative impact on wildlife has been habitat destruction through converting the surface of land to uses which better satisfy his needs. Also important have been the indiscriminate exploitation of many species for their economic value with little regard for their ability to sustain a yield or to withstand disturbance, and the eradication of supposedly competitive wild animals and of animals which are suspected of spreading diseases of man and his domestic animals.

378. The main need at present is to reverse these destructive trends, through land-use programmes designed to conserve and restore representative ecosystems and by promoting the protection and the reintroduction of indigenous species outside reserves. International co-operation and agreement is essential for the conservation of migratory species of birds, mammals and reptiles. In the area of conservation, FAO and UNESCO are the most deeply involved United Nations agencies. Outside the United Nations system, the activities of IUCN and WWF are most notable. ^{133/}

379. The following major inadequacies in knowledge and action require particular attention:

(a) Inadequacies in knowledge relating to:

- (i) The life history and ecological requirements of individual species; the interaction of different species; wildlife management; the actual and potential economic and social values of wildlife; adequate size and correct boundaries of conservation areas; and taxonomic studies of tropical animals and plants;

(ii) Threatened species and critically important areas of habitat;

^{132/} For a detailed account of the overview, see UNEP/PROG/4 (1976).

^{133/} For a detailed survey of the activities of Governments, United Nations agencies and intergovernmental and non-governmental organizations, see UNEP/PROG/3 and 5 (1976) and UNEP/GC/60.

(b) Inadequacies in action:

- (i) Continuous monitoring of protected areas and of biotic communities;
- (ii) Exchange of information and research data, and co-ordination of wildlife research and management;
- (iii) Adherence to existing international agreements and development of conventions for wildlife and protected areas;
- (iv) Training and education programmes at all levels to foster an understanding of wildlife and to encourage greater recruitment into wildlife-based activities and industries.

(b) Objectives, strategies and concentration areas

380. The objectives and strategies for national parks and reserves (ecosystems, sites and samples) and for endangered species and wildlife were endorsed at the third session of the Governing Council ^{134/} and have been summarized elsewhere. ^{135/}

381. These subjects have not been identified as concentration areas by the Governing Council, and most activities that have taken place or are planned under wildlife and protected areas have been selected because they support activities in approved concentration areas.

(c) Activities

382. The activities are:

Activity A - Appraisal of the distribution and status of species of animals and plants, and of their habitats, and identification of various vegetation types (paragraph 383).

Activity B - Development of education and training programmes for national parks and wildlife managers and other conservation experts, and information campaigns for the public (paragraphs 384-385).

Activity C (1978-1980) - Development of a global plan for (a) the restoration, conservation and management of wildlife resources and their habitats, and (b) the establishment, development and management of a network of national parks, biosphere reserves and other protected areas (paragraphs 386-388).

Activity D (1977-1980) - Continued support for international conventions, and review of the status of existing international and national agreements and legislation so as to identify gaps in their effectiveness and initiate action to fill them (paragraphs 389-391).

383. Activity A - This is unavoidably a long-term activity. Information on the distribution and status of species of animals and plants and the existence of various vegetation types (biotic provinces) is gathered and disseminated by FAO, UNESCO (MAB), ICSU, IUCN, IWRB, ICBP, EEC, the Council of Europe and other organizations. However, important gaps remain in the assessment (including monitoring) of the status of wildlife species and various vegetation types, and UNEP is therefore co-operating with FAO, UNESCO (MAB), and IUCN in identifying what needs to be done, and how to organize ecological surveys, including wildlife inventories, prepare vegetation maps and develop research and monitoring programmes in biosphere reserves on a global basis. ^{136/} This review will lead to consultations with Governments about the action required to implement national or regional plans agreed upon as a result of UNEP-assisted meetings, country missions and/or surveys. In the case of developing countries, these discussions may be followed by technical assistance.

^{134/} Decision 29 (III).

^{135/} UNEP/GC/INFORMATION/I, sect. III. B.1 (d) (i) and (ii) and (e) (i) and (ii).

^{136/} FP/0605-74-02/Global/UNESCO/78,000/49,000/IV'74-XII'76/GC/61, 62 and 96, RA/1103-75-04/Global/IUCN/3,098,500/1,555,000/V'75-XII'77/GC/61, 62 and 96.

384. Activity B - FAO, UNESCO (MAB), IUCN, the African Wildlife Leadership Foundation (AWLF), the National Parks Service of the United States and Parks Canada have supported education and training programmes for national parks and wildlife managers and conservation experts. It is intended to initiate actions extending over several years and to strengthen and co-ordinate training in Africa, Asia, Latin America and Europe. Starting during 1977, priority will be given to strengthening the existing education and training programmes in national parks and wildlife management.

385. In the related field of public information, numerous actions are already undertaken by FAO, UNESCO, IUCN and other intergovernmental and non-governmental organizations; UNEP is co-operating in these activities in Asia. 137/ Training, information and public awareness components which are relevant to conservation are incorporated in many other actions undertaken under terrestrial ecosystems.

386. Activity C - A number of actions related to ecosystems conservation are being carried out by international and national organizations and countries throughout the world. However, there is a need for closer international and regional co-operation and co-ordination in ecosystem conservation. To this end UNEP sponsored the establishment of the Ecosystem Conservation Group, at present consisting of UNEP, FAO, UNESCO and IUCN. 138/ The Group plays a valuable role in identifying conservation problems, setting priorities for action and co-ordinating, supporting and co-sponsoring work undertaken jointly with other organizations and Governments concerned.

387. Drawing on the accumulated experience of the many organizations involved, and using the consultative and co-ordinating mechanism of the Ecosystem Conservation Group, it is intended to prepare a plan for the restoration, conservation and management of wildlife and its habitats. This plan should be completed by 1979-1980, and will contain proposals for assessment and management actions with the eventual aim of establishing a system of national parks, biosphere reserves and other protected areas, covering representative examples of various ecosystems. A draft UNEP/UNESCO/IUCN paper on the biosphere reserve and its relationship to other conservation efforts has already been prepared.

388. A number of ongoing actions (all of which have been or will be undertaken in collaboration with FAO, UNESCO and IUCN) are relevant to the preparation of this broad plan. 139/

389. Activity D - FAO, UNESCO and the IUCN Environmental Law Unit are among a number of bodies involved in promoting international and national legislation for the conservation and management of wildlife and their habitats.

390. Actions in which UNEP is directly involved include:

(a) Provision of a secretariat for the Convention on International Trade in Endangered Species of Wild Fauna and Flora is a UNEP responsibility which has been carried out since the inception of the Convention in 1974 by special arrangement with IUCN. 140/ The First Conference of Parties to the Convention, held at Berne in November 1976, noted that the number of States adhering to the convention was growing steadily, urged the Executive Director to strengthen the secretariat, and called for a working session of parties on implementation issues in late 1977;

(b) Support for a convention on conservation of migratory species of wild fauna. 141/ A preliminary draft of the convention was prepared by IUCN and discussed in Bonn in July 1976 at a governmental conference convened by the Federal Republic of Germany; the conference agreed guidelines for the preparation of a revised draft;

137/ UNEP/GC/INFORMATION/4.

138/ FP/1104-75-02/Asia, Far East and Pacific/FAO/21,400/6,400/1'75-XII'76/GC/62 and 96.

139/ RA/1103-75-04/Global/IUCN/3,098,500/1,555,000/1'75-XII'77/GC/61, 62 and 96, FP/0605-74-04/Africa West/IUCN/63,000/44,000/1'75-IV'76/GC/61, 62 and 96, FP/1103-76-01/Global/UNESCO/54,900/47,600/XI'75-IV'76/GC/61, 62 and 96, FP/0605-74-03/Africa/Internal/145,500/145,500/XI'74-X'76/GC/61, 62 and 96.

140/ FP/1104-76-01/Global/IUCN/202,250/202,250/75-VI'77/GC/61, 62 and 96.

141/ Governing Council decision 56 (IV), which urged Governments to protect migratory species of birds, is relevant in this context.

(c) Advice given to Governments by UNEP, in close co-operation with FAO, UNESCO and IUCN, on adhering to relevant conventions. 142/

391. Proposed actions involve continued support for the foregoing and a review to be undertaken by UNEP in close collaboration with FAO, UNESCO and IUCN's Environmental Law Unit, of the status and effectiveness of international agreements relating to global or regional programmes for the conservation and management of wildlife and endangered species. On the basis of this review, proposals will be made to the Governing Council at its seventh session designed to increase the effectiveness of existing legislation and/or to prepare new agreements. New agreements may include a world-wide convention to strengthen the conservation of wild species and their habitats and a national parks convention to increase the protection given to national parks, biosphere reserves and other protected areas.

(d) Proposed Fund programme activities

392. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Studies and assessment of status of wildlife and their habitats and protection thereof (paragraph 383);

(b) Education, training and information (paragraphs 384 and 385);

(c) Support for the preparation of a plan for the restoration, conservation and management of wildlife and its habitats (paragraphs 387-388);

(d) Secretariat for the Convention on International Trade in Endangered Species of Wild Fauna and Flora (paragraph 390 (a));

(e) Advisory services to Governments (paragraph 390 (c));

(f) Review of legislation, promotion of international agreements and development of conventions (paragraph 391).

9. Major policy issues for the attention of the Governing Council

393. The Governing Council may wish to focus its policy consideration of this section principally on the following issues:

(a) The increased emphasis put on demonstration and field actions in such areas as tropical woodlands and forests (paragraphs 281-286), soils (paragraphs 318-319) and water (paragraphs 335-340 and 349);

(b) In the sub-section on tropical woodlands and forests, the plan of action on "Trees" (paragraphs 288-290);

(c) In the sub-section on arid and semi-arid ecosystems:

(i) The intention to concentrate effort around EMASAR, IPAL and desert encroachment in the Sudan (paragraphs 262-269);

(ii) The actions in the field of firewood and substitutes (paragraph 270 (a));

(d) In the sub-section on soils:

(i) The timeliness of the shift in emphasis from assessment to management actions (paragraphs 318-319);

(ii) The increased importance given to the rehabilitation of mined areas (paragraphs 320-321);

(e) In the sub-section on water, the intention to give greater attention to health aspects (paragraphs 335-338 and 340);

(f) In the sub-section on genetic resources:

(i) The increasing importance given to microbiology in environmental management (paragraphs 358-364);

(ii) The emphasis on co-ordinating mechanisms (paragraphs 358, 365, 368);

(g) In the sub-section on wildlife and protected areas:

(i) The integration of all activities related to the conservation of ecosystems and their biotic resources (paragraphs 252 and 382);

(ii) The current and planned actions relating to legislation (paragraphs 389-391).

C. ENVIRONMENT AND DEVELOPMENT

1. Introduction

394. UNEP's concern in environment and development is to help ensure that environmental considerations, including those relating to long-term sustainability of the development process are fully reflected in thinking and action on development.

395. In accordance with Governing Council decision 48 (IV), paragraph 3, the Level One overview of environment and development is to be prepared for the sixth session of the Governing Council. In reporting below on the Level Two and Three activities, the seven divisions of this priority subject area used in the Executive Director's report to the Governing Council at its fourth session have been regrouped into four and retitled as follows:

Sub-sections of environment and development

Used in UNEP/GC/61

1. Integrated approach to environment and development)
2. Ecodevelopment)
3. Socio-economic impact of environmental measures or their absence)
4. Natural products, including food (new and alternative products, rational use of natural resources, substitution, rational use of synthetic products)
5. Technology (environmentally sound and appropriate technology))
6. Industrial location)
7. Environmental problems of specific industries)

Used in this report

1. Integrated approach to environment and development, including eco-development
2. Use of natural resources
3. Environmentally sound and appropriate technology
4. Industry and environment

This reorganization is adopted as a result of experience gained in developing the programme; it is not, of course, intended to neglect activities previously identified separately, but to make sure that all activities in the priority subject area fit within a rational framework.

2. Integrated approach to environment and development,
including ecodevelopment

(a) Objectives, strategies and concentration areas

396. At its third session, the Governing Council endorsed the objectives and strategies for the three sub-sections which have been brought together under this new title; 143/ at its fourth session it decided to add some new strategy elements to these sub-sections:

- (a) Integrated approach to environment and development;
- (b) Socio-economic impact of environmental measures and of their absence. 144/

The approved objectives and strategies have been summarized elsewhere. 145/

397. The Governing Council at its fourth session took a decision on environment and development 146/ which affects the way in which the approved strategies for this sub-section and that of natural resources are to be pursued. The Council:

(a) Requested the Executive Director to devote increased attention to the relationship between environment and development, including research into development of appropriate institutions, the implementation of relevant management techniques and the convening of regional and sub-regional intergovernmental meetings and seminars;

(b) Authorized him to convene an intergovernmental expert group meeting in 1976 to consider the subject matter of his reports 147/ on environment and development, ecodevelopment and the environmental impact of the irrational and wasteful use of natural resources, with a view to preparing criteria for assessing that environmental impact;

(c) Drew the Executive Director's attention to the desirability of giving special attention to certain aspects of the programme on environment and development;

(d) Requested him to report on:

- (i) The outcome of meetings held in accordance with (a) and (b) above;
- (ii) The level and ways and means of assisting developing countries in establishing or upgrading their standards for control for technological innovations in the light of environmental and other considerations.

398. Also at its fourth session, the Governing Council agreed that the following part of the integrated approach to environment and development should be considered a concentration area:

- (a) Development of an improved conceptual and methodological approach to integration of environmental considerations within the development process and further elaboration and application of the concept of ecodevelopment; 148/

In the light of Governing Council decision 79 (IV), the Executive Director believes that it is necessary to reword this concentration area as follows:

- (b) Support for international and regional efforts to identify environmentally sound development alternatives, especially through the organization of regional seminars on alternative development patterns.

143/ Decision 29 (III).

144/ Decision 50 (IV), para. 5 (b) and (c).

145/ UNEP/GC/INFORMATION/1, sect. III. C. 1 (a) (i) and (ii).

146/ Decision 79 (IV), particularly paras. 3-6.

147/ Documents UNEP/GC/76, UNEP/GC/79 and UNEP/GC/80.

148/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

(b) Activities

399. All the activities fall within the approved concentration area, though the proposed rewording would focus special attention on Activity A. The activities are:

Activity A (1977-1979) - Promotion of environmentally sound patterns of development and life styles, at the regional and global levels (paragraphs 400-401).

Activity B (1977-1980) - Mounting country missions to obtain knowledge of environment-development relationships and to promote national programmes of environmentally sound development (paragraphs 402-403).

Activity C (1977-1980) - Implementation of empirical studies and pilot projects to examine socio-economic implications of environmental measures or their absence, and to test the concept of ecodevelopment and other methodological approaches to integrating environmental considerations into decision-making (paragraphs 404-408).

Activity D - Encouraging international organizations within and outside the United Nations system to incorporate environmental considerations in their development programmes (paragraphs 409-411).

Activity E - Collaboration with United Nations agencies and research organizations in the formulation of international development strategies, including strategies addressed to achieving sustainable satisfaction of basic human needs (paragraphs 412-415).

400. Activity A will involve, in part, studies of alternative, environmentally sound patterns of development and life styles within each major geographical region. These will be complemented, wherever possible, by reports being prepared by the United Nations regional commissions on the long-term economic development of their respective regions, in accordance with General Assembly resolution 3508 (XXX). These and other conceptual and methodological sources will be used as background material in seminars which it is planned to convene in 1977 and 1978 for the ECA, ECE, ECLA, ECWA and ESCAP regions, in collaboration with the regional commission concerned.

401. These seminars will be attended by national planners and will focus on environmentally sound development alternatives and life styles of relevance to each region in the light of its particular characteristics and needs; subjects covered will include technology, transport, spatial aspects of development, productive use of wastes and patterns of consumption. Participation of United Nations organizations will be sought in the areas of their competence, e.g. with FAO, ILO and UNCTAD, and in respect of transport, with the Centre for Natural Resources, Energy and Transport, the Intergovernmental Maritime Consultative Organization (IMCO) and ICAO, with all of whom some relevant discussions have already taken place. The conclusions of the regional seminars will be brought together in an interregional seminar on the same subject to be held in 1979, after which it will be possible to disseminate appropriate guidelines on the subject to Governments and to see how the conclusions can be reflected in the further evolution of the programme.

402. Activity B - Country missions will serve two main purposes:

(a) Gathering information on the scope and methodology for incorporating environmental considerations in development planning and decision-making;

(b) Identification and promotion of environmentally sound development alternatives within the framework of national development planning.

403. The first country mission will be to Kenya, in 1977, in co-operation with the Government and UNDP. With the initial experience gained in Kenya, approaches will be made in 1977 and 1978 to a few countries in Latin America, Asia and Africa to explore the possibility of mounting further missions, to be carried out in collaboration with UNDP, United Nations agencies and Governments. These missions will be supported by pilot studies on environmental statistics and data collection (paragraphs 162-163).

404. Activity C - Work has been initiated in collaboration with the United Nations Research Institute for Social Development (UNRISD) 149/ to investigate social perceptions, values and attitudes in relation to physical environmental changes, and to assess the social impact of these changes. This study is expected to throw light on the social implications of implementing environmentally sound development programmes and measures (see also paragraph 150).

405. Complementing this investigation is an economic study of methodologies for including environmental factors in development project analysis. This study, which has been initiated in collaboration with the Institute of Development Studies, University of Sussex, 150/ is also expected to put forward suggestions for new or improved methodologies. The final report is expected to be ready by May 1977 (see also paragraph 658).

406. UNEP's role in ecodevelopment is to develop the concept from an operational standpoint and to encourage national and regional planners to apply it. To this end, the International Centre for Research on Environment and Development (CIRED), Paris, in co-operation with UNEP, has been conducting research on ecodevelopment. 151/ Under the auspices of CIRED, an Ecodevelopment Newsletter is expected to begin publication in early 1977. The National Institute for the Development of Renewable Natural Resources, Colombia, in co-operation with UNEP, has been conducting pre-programming studies for a pilot ecodevelopment project in Colombia. 152/

407. Several developed and developing countries have shown an interest in ecodevelopment and its application to planning in urban and rural areas. A number of research institutions are examining the concept, and the subject has been introduced into the programme of work of the United Nations University.

408. The future work on ecodevelopment will be evolved as part of the broader aims of promoting environmentally sound development. It will include:

- (a) Pilot ecodevelopment projects in the developing regions, beginning with pre-programming activities in Africa, Asia and the South Pacific;
- (b) Linking ecodevelopment with relevant programme activities, such as appropriate technology (paragraph 435), rural energy centres (paragraph 535), use of natural resources (paragraph 421), basic human needs (paragraph 414), human settlements as ecosystems (paragraph 195) and environmental management (paragraph 661 (b));
- (c) Encouragement of ecodevelopment-related research, especially research on the practical applications of the concept.

409. Activity D - At its fourth session, the Governing Council urged governing bodies of United Nations organizations "to take environmental considerations fully into account in making their recommendations for new goals and objectives for the remainder of the Second United Nations Development Decade". 153/ This request, and the broader aims of this activity, are met by consultations and joint programming with international agencies which have a mandate in the field of development, such as the World Bank, UNDP, the Department of Economic and Social Affairs, UNCTAD, the United Nations Industrial Development Organization (UNIDO), FAO and ILO, and the regional commissions, and also by advocating environmentally sound approaches to development in such forums as the fourth United Nations

149/ FP/0406-74-05/Global/UNRISD/28,000/14,000/IX'74-VI'75/GC/32. FP/0406-76-01/Global/UNRISD/61,350/57,350/1'76-VII'76/GC/96. FP/0406-76-02/Global/UNRISD/VII'76-VII'79/GC/96.

150/ FP/0404-76-01/Global/IDS/71,000/60,500/VIII'76-X'77/GC/96.

151/ FP/0405-75-01/Global/Internal/98,800/IV'75-III'76/GC/68. FP/0405-76-02/Global/CIRCD/521,800/235,500/X'76-IX'78/GC/96.

152/ FP/0405-75-02/Colombia/Internal/84,000/VIII'75-VII'77/GC/68 and 96.

153/ Decision 79 (IV), para. 2.

Conference on Trade and Development, the International Labour Conference and the World Peace Council. More generally, the purposes of this activity are served by many co-operative initiatives throughout the environment programme which encourage organizations inside and outside the United Nations system to give the environment due recognition in their policies and programmes.

410. The Environment Co-ordination Board has initiated two examinations of sectoral activities in which its members are engaged, in order to identify the impacts of these on the environment. A study of the environmental and health impacts of water development projects, undertaken principally by FAO and WHO, was submitted to the Board at its sixth session, which recommended that current procedures should be examined by the organizations concerned (the United Nations, FAO, UNESCO, WHO, the World Bank, UNDP, UNICEF and UNEP). At the same session, the Board asked that a similar study of the impact of industrialization processes on environmental health should be carried out by UNIDO, WHO, the World Bank, ILO and UNEP. The Board also initiated a more general systematic study of its members' activities to establish any adverse environmental impacts of these and the actions already taken or required to reduce these impacts. 154/

411. At its fourth session, the Governing Council requested the Executive Director "to explore with bilateral and multilateral aid donors ways and means of ensuring that environmental considerations are taken fully into account in their policies and programmes". 155/ To some extent this decision is being implemented through joint programming and consultations, but more information is needed about current practices before this process can be taken very far. Therefore a review has been initiated with the International Institute of Environment and Development (IIED), London, 156/ to assess how environmental factors are included in the development assistance policies of multilateral lending agencies; the final report is expected by July 1977.

412. Activity E - In co-operation with the regional commissions and specialized agencies, the Department of Economic and Social Affairs is preparing long-term projections and forecasts under the title "Project 2000". 157/ Since this work relates closely to UNEP's interest in alternative development patterns and basic human needs, UNEP will co-operate with the Department and the regional commissions to derive environmentally sound recommendations for international, regional and national policies bearing on the future course of world development.

413. Similarly, UNEP will contribute to the formulation of a new international development strategy by proposing environmentally sound approaches to the satisfaction of basic human needs and prudent patterns of development and life styles for adoption by rich and poor countries.

414. A study has been undertaken to develop methodologies for assessing the non-satisfaction of basic human needs and the key resources required for their satisfaction (see paragraph 114). As explained in the Earthwatch section, this activity is expected to lead to support for work undertaken within the United Nations system to assess non-satisfaction of those needs and the development of environmentally sound strategies for their satisfaction. This will require UNEP to co-operate with other bodies in the United Nations system within the framework of the Administrative Committee on Co-ordination (ACC), and in particular with ILO, the World Bank, WHO, FAO and UNESCO.

154/ UNEP/GC/89, para. 14 (g).

155/ Decision 47 (IV), sect. III, para. 3.

156/ FP/1000-76-01/Global/IIED/104,800/62,500/VIII'76-VII'77/GC/96.

157/ General Assembly resolution 3508 (XXX).

415. Development strategies which succeed in satisfying the basic needs, in particular strategies which enable the poor to realize tangible benefits from development and enable women to participate actively in the development process, are likely to have a salutary impact on current rates of population increase, with a corresponding improvement in the quality of the human environment. In this connexion, UNEP will continue to co-operate with the United Nations Fund for Population Activities (UNFPA) and other United Nations bodies in implementing the World Population Plan of Action 158/ adopted at the World Population Conference.

(c) Proposed Fund programme activities

416. The Executive Director proposes to support the following actions from the Fund of UNEP:

(a) Regional seminars on alternative patterns of development and life styles (paragraphs 400-401);

(b) Country missions (paragraph 403);

(c) Research into the integration of environmental considerations in development, including ecodevelopment (paragraphs 404-408);

(d) Identification and promotion of strategies for achieving sustainable satisfaction of basic human needs (paragraphs 412-413)

3. Use of natural resources

(a) Objectives and strategies

417. The objectives and strategies for natural products, including food, were endorsed by the Governing Council at its third session 159/ and have been summarized elsewhere. 160/

418. Though this is not a concentration area, the General Assembly and the Governing Council have taken a close interest in specific aspects of the use of natural resources. Thus paragraph 4 of General Assembly resolution 3326 (XXIX) invited the Executive Director to prepare a report on the environmental impact of irrational and wasteful use of natural resources. The Council agreed to the Executive Director's suggestion 161/ that work should proceed along two lines:

(a) Consultations and expert group meetings to establish criteria which could be used in judging "irrationality" and "wastefulness";

(b) Identification of a few natural resources which should receive priority attention. It was suggested that soil, water and energy should be the resources to be dealt with initially.

419. After consultations with experts, the Executive Director was able to present his report on the environmental impact of the irrational and wasteful use of natural resources to the Governing Council at its fourth session. The Council's decision on this matter has already been referred to in paragraph 397.

(b) Activities

420. The activities are:

Activity A (1977-1978) - Development and application of principles and criteria for rational and non-wasteful use of natural resources (paragraphs 421-422).

Activity B - Investigation of the possibilities of substitution of resources in production with a view to promoting greater use of resources which have less adverse environmental impacts (paragraphs 423-424).

158/ United Nations publication, Sales No.: E. 75. XIII. 3, chap. I.

159/ Decision 29 (III).

160/ UNEP/GC/INFORMATION/I, sect. III. C. I (d) (i) and (ii).

161/ UNEP/GC/51, para. 24 (a) (i) and (ii).

421. Activity A - Following Governing Council decision 79 (IV) the Executive Director requested comments from Governments, specialized agencies and other United Nations bodies, and convened an intergovernmental expert group meeting (24-28 January 1977) to consider environment and development and the environmental impact of the irrational and wasteful use of natural resources. The Executive Director is reporting the conclusions of this meeting to the Governing Council, together with his comments, in document UNEP/GC/102. The interacting relationships between natural resources, development and environment, and ecodevelopment will be further elaborated in the Level One review on environment and development to be submitted to the sixth session of the Council.

422. The second stage in the implementation of this activity will be research into guidelines for the utilization of soil, water and energy (paragraph 418 (b)). Work relating to all three resources is under way in other parts of the environment programme (see chapter III, section B, sub-section 5 (soils) and 6 (water), and section E (energy)), and experience from these activities will be taken into account in the research. The analysis will be conducted at the regional and national level and it is planned to involve other organizations, especially the United Nations regional commissions, the Centre for Natural Resources, Energy and Transport (water and energy) and FAO, (soils and land use). An understanding of the environmental impact of the use of these resources should benefit from other activities, especially the work on methodologies for ensuring that social and environmental factors are taken into account in the evaluation of natural resources (UNCTAD and UNEP). ^{162/} The successful outcome of the second stage of this activity will also depend on the co-operation of Governments, for example in providing the necessary data for the reviews.

423. Activity B is concerned with examining the possibilities of substitution between: natural and synthetic products; raw materials requiring little energy to produce and those requiring more energy; renewable and non-renewable resources; and abundant and scarce resources.

424. Only a modest start has been made on this activity. UNEP has requested UNCTAD to review the impact of measures for the protection of the human environment on the competitive position of natural and synthetic materials. ^{163/} Following consultations with agencies and other organizations on the UNCTAD report, ^{164/} it may be possible to propose more precise actions in this regard by the time of the sixth session of the Governing Council.

(c) Proposed Fund programme activities

425. The Executive Director proposes to support the following actions from the Fund of UNEP:

Research into guidelines for the rational utilization of natural resources (paragraph 422).

4. Environmentally sound and appropriate technologies

(a) Objectives, strategies and concentration areas

426. The objectives and strategies were endorsed at the third session of the Governing Council and have been summarized elsewhere. ^{164/}

427. The Governing Council at its fourth session decided that the following aspect should be a concentration area:

- Support for measures for development and dissemination of environmentally sound and appropriate technologies. ^{165/}

^{162/} FP/0406-74-03/Global/UNCTAD/657,800/444,200/XII'74-VI'77/GC/32 and 96.

^{163/} FP/0402-73-07/Global/UNCTAD/149,000/102,000/I'74-IX'75/GC/32.

^{164/} Decision 29 (III) and UNEP/GC/INFORMATION/1, sect. III. C. 1 (e) (i) and (ii).

^{165/} UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

(b) Activities

428. The activities are:

Activity in the concentration area

Activity A - Generation and development of environmentally sound and appropriate technologies (paragraphs 429-435).

Other activities

Activity B (1977-1979) - Preparation of a section on environmentally sound and appropriate technology as UNEP's contribution to the United Nations Conference on Science and Technology for Development (1979) (paragraph 436).

(i) Activity within the concentration area

429. Activity A - The conceptual part of this activity has been undertaken through expert consultations in two stages: definition of the problem, and establishment of a methodology to select environmentally sound and appropriate technologies. 166/

430. During the consultations, key environmental, economic and social aspects of modern technology were analysed. Large productive units and too much emphasis on urban as against rural development were identified as being prominent causes of many of the problems associated with technological development. Technologies were termed environmentally sound and appropriate if they supported ecologically balanced growth and promoted economic and social justice.

431. It was concluded that the choice of technology was an issue of great importance to all countries and should be guided by environmental as well as economic and social criteria. Environmental criteria concerned the rational and sustained use of resources, and protection of the life-supporting systems of the environment; economic criteria should accommodate selection of need-based, and not merely demand-oriented technologies; social criteria should entail selection of technologies which promote self-reliance on the part of the community involved.

432. Many United Nations offices and agencies, such as the Office for Science and Technology, UNCTAD, UNIDO, ILO, FAO, WHO, UNESCO and ECE, undertake actions in the field of technology which have a bearing on the UNEP strategy. For example, ECE held a Seminar on Principles and Creation of Non-waste Technology and Production; the methodology and principles of non-waste technology elaborated at the seminar may be useful in other regions, and UNEP therefore intends to co-operate with ECE in this area. FAO incorporates environmentally sound and appropriate technologies in the implementation of programmes for crop production, soils, fishery, forestry and rural development; WHO is concerned with water supply technologies; UNEP and UNIDO are examining appropriate technologies for the sugar industry for Africa, 167/ and ILO is doing so for India; ILO's World Employment Programme promotes the development and dissemination of socially appropriate technologies in the construction, agricultural and manufacturing sectors. Many other organizations are involved in relevant actions in other parts of the environment programme, e.g. in human settlements (paragraph 176), water (paragraphs 335-340), treatment of agro-industrial wastes (paragraphs 450-451) and energy (section E). UNEP aims to ensure that all international actions in the area of technology promote technologies which are environmentally sound and appropriate.

166/ FP/0402-75-02/Global/Internal/95,900/X'75-XII'76/GC/68 and 96.

167/ FP/0402-75-04/Africa/UNIDO/226,000/200,000/IX'75-XII'77/GC/68 and 96.

433. UNIDO, UNCTAD, UNESCO and the World Intellectual Property Organization (WIPO) are co-operating in an effort to reduce the technological dependence of developing countries, an issue which has important environmental implications. At its fourth session, 168/ UNCTAD recognized the interrelationship between environment, transfer of technology and development planning, welcomed UNCTAD/UNEP co-operation in this field, 169/ and reiterated the decision of its Committee on Technology Transfer, 170/ which had requested the Secretary-General of UNCTAD to pursue studies on the environmental impact of technological dependence and appropriate policies. UNEP is co-operating with UNCTAD in elaborating an international code of conduct on transfer of technology, in which aspects of environmental soundness and appropriateness will be covered; with WIPO to ensure that environmental considerations are taken into account in WIPO activities; and with UNIDO in other environmental aspects of technology transfer.

434. These actions support the UNEP strategy, but are not considered sufficient to fill all the gaps in knowledge and action; hence, the Governing Council at its fourth session approved the development of a network of pilot projects on environmentally sound and appropriate technology, 171/ which would:

(a) Demonstrate, through practical projects relevant to a variety of environments and of basic needs, and executed by a number of institutions, the selection and development of environmentally sound and appropriate technologies;

(b) Catalyse in these institutions the capability to choose and develop such technologies;

(c) Strengthen UNEP's information and referral base in these technologies.

435. UNEP's role in the operation of the network is catalytic. The actual selection and development of technologies will be carried out by institutions around the world with demonstration capability and the capacity to design and test new technologies. Through the development of prototype products and processes and the publication of studies, actions in the network will contribute to the design of alternative development patterns and the testing of ecodevelopment. The regional networks on human settlements technologies (paragraphs 187-188) will form part of this global network.

(ii) Other activities

436. Activity B - Within the framework of UNEP's contribution to the United Nations Conference on Science and Technology for Development, a paper will be prepared on environmentally sound and appropriate technologies in relation to development. A contribution related to appropriate technology will also be included in the supplementary chapter on Environment in the World Plan of Action for the Application of Science and Technology for Development.

(c) Proposed Fund programme activities

437. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Low and non-waste technology (paragraph 432);

(b) Transfer of technology (paragraph 433);

(c) Network of pilot projects on environmentally sound technologies (paragraphs 434-435);

(d) Participation in the preparation of documents for the United Nations Conference on Science and Technology for Development (paragraph 436).

168/ UNCTAD resolution 87 (IV), Strengthening the technological capacity of developing countries, TD/217, paras. 19-21.

169/ FP/0402-75-01/Global/UNCTAD/778,000/457,000/1'75-X11'77/GC/68 and 96.

170/ UNCTAD Committee on Technology Transfer, first session, decision 2 (1), TD/B/593 - TD/B/C.6/17.

171/ UNEP/GC/61, para. 171.

5. Industry and environment

(a) Objectives, strategies and concentration areas

438. The objectives and strategies for industrial location and the environmental problems of specific industries, now grouped under industry and environment, were endorsed at the third session of the Governing Council 172/ and have been summarized elsewhere. 173/

439. UNEP's work takes account of the basic strategies for industrialization contained in the Lima Declaration and Plan of Action on Industrial Development Co-operation adopted by the Second General Conference of UNIDO 174/ and General Assembly resolutions 3201 and 3202 (S-VI) regarding the establishment of a new international economic order. UNEP believes that the industrialization strategies aimed at implementation of that new order should take place within environmentally sound frameworks.

440. The Council at its fourth session agreed that the following should be a concentration area: definition of environmental problems of specific industries and development of guides to action for Governments and industries in dealing with them, particularly through the programme of industry seminars. 175/

441. Also at its fourth session, the Governing Council 176/ requested the Executive Director to arrange a consultative meeting of experts nominated by interested Governments and relevant organizations to review the objectives of the programme in relation to environmental problems of specific industries and to evaluate progress being made towards those objectives.

442. A consultative meeting of experts was held in Paris, in December 1976. The meeting endorsed the objectives and strategies of the programme in relation to environmental problems of specific industries, but considered that the preparatory process could be improved. What was required was less a series of "seminars" for each industrial sector than a continuous process of communication and consultation so as to exchange experience on environment and industry between Governments, industry, workers and other organizations concerned. The process should cover environmental protection through pollution control, improved resource utilization, industrial location and adoption of environmentally sound and appropriate technologies.

443. The meeting concluded that:

(a) In respect of the individual reviews of each industry:

- (i) The preparatory process should be designed to define the results to be obtained and focussed on the specific needs of countries, especially developing ones;
- (ii) At the outset of this process, there should be an exploratory meeting of interested parties to identify the issues;
- (iii) Issues should be evaluated by workshops, expert consultations, consultants, task forces and seminars, though formal seminars were not always needed. UNEP should catalyse and co-ordinate such activities, but the lead could be taken by an individual country;

172/ Decision 29 (III).

173/ UNEP/GC/INFORMATION/I, sect. III. C. 1 (f) (i) and (ii) and (g) (i) and (ii).

174/ See A/10112, chap. V.

175/ UNEP/GC/57, para. 4 and decision 47 (IV), sect. I, para. 3.

176/ Decision 57 (IV).

- (iv) As a basis for recommendations, a comprehensive data base should be provided on environmental problems and opportunities for their solution, including appropriate technologies;
 - (v) Pollution control techniques and environmentally sound and appropriate technologies should be demonstrated; such demonstrations could also be of educational and training value, geared particularly to the needs of developing countries;
 - (vi) The results of the review should be drawn together in a final meeting of interested parties, which would consider policy aspects and recommendations for consideration by Governments;
- (b) In respect of the entire programme of reviews:
- (i) Governments, industry, workers and international interests concerned should consider designating focal points to help co-ordinate contributions to the programme and disseminate the outcome of each review;
 - (ii) UNEP should consider establishing an advisory group with balanced geographical representation and including employers, workers and international organizations, to assist the Executive Director in planning and implementing the programme;
 - (iii) There should be no further formal seminars, other than those already in an advanced stage of preparation (i.e. agro-industries and petroleum), until the Governing Council had considered, at its fifth session, the issues identified by the consultative meeting.

444. The Executive Director has reviewed the recommendations of the consultative meeting. Since the objectives envisaged for the standing advisory group could more appropriately be attained by consultants and ad hoc expert meetings, it is not intended to establish such a standing group. Other recommendations of the meeting have been taken into account in shaping the activities described below.

(b) Activities

445. The activities are:

Activity within the concentration area

Activity A (1977-1980) - Completion of the review of, and dissemination of information about, the environmental problems associated with major industrial sectors (pulp and paper, aluminium, motor vehicle, agro-industries, petroleum, chemicals including pharmaceuticals, iron and steel, and non-ferrous metals other than aluminium) (paragraphs 446-454).

Other activities

Activity B (1977-1979) - Completion of a study of the impact of industrialization processes on environmental health (paragraph 455).

Activity C (1977-1980) - Development of environmental criteria and recommendations for industrial location (paragraphs 456-457).

(i) Activity within the concentration area

446. Activity A - The review of environmental problems for each industrial sector will in future be undertaken through a continuous process of communication and consultation, involving:

- (a) Definition of the nature and scope of problems;
- (b) Identification of available solutions to those problems;

(c) Definition of unresolved problems;

(d) Consolidation of resulting information into overall policy guidance, including guidance on resource and energy utilization and conservation, and land use planning.

447. When a formal seminar is considered necessary for an industrial sector, it should be preceded by a preliminary meeting of a few governmental and industrial experts to identify the problems. The meeting would also work out a detailed plan for considering each problem, or group of problems, through in-depth studies in workshops of manageable size, organized, as appropriate, with the co-operation of United Nations agencies such as UNIDO and ILO.

448. The seminar or any other appropriate form of meeting would be attended by representatives of Governments, industry and workers at the policy-making level. The chairmen or rapporteurs of the preparatory workshops would report their findings; discussion would focus on these reports, and lead to conclusions and recommendations, which might need to be brought to the attention of the Governing Council.

449. Pulp and paper, aluminium, motor vehicles and part of the agro-industrial sector have been reviewed by seminars. It is intended that the remaining industrial sectors should be examined in the period 1977-1980. Three small groups of experts will be formed in order to pursue the recommendations of the seminars on the pulp and paper, aluminium and motor vehicle industries.

450. The agro-industrial waste seminar, the first in a series of five reviews on the agro-industrial sector, was undertaken jointly with FAO in January 1977. This meeting examined the technical, socio-economic and institutional problems of environmentally sound utilization of residues from agriculture, fisheries, forestry, intensive animal rearing and other agro-industries.

451. As a follow-up to the agro-industrial waste seminar, a compendium of environmentally sound technologies for residue utilization is in preparation; this will be updated regularly. In addition, a few local demonstration activities will be undertaken in different regions, as well as a number of regional workshops on specific uses for residues.

452. The second review in the agro-industrial sector will deal mostly with post-harvest losses and, as part of this, a seminar will be held jointly with FAO early in 1978.

453. Preparations are well under way for a seminar on environmental conservation in the petroleum industry, to be held in the first part of 1977; this is expected to provide an input to the fossil fuel panel (see paragraph 531). Environmental problems associated with the chemical and iron and steel industries will be the subject of an exploratory meeting of experts and introductory papers will be prepared by consultants; this will be done by early 1978.

454. In association with each review, technical assistance and training will be provided to Government policy-makers, environmental engineers and plant operators in developing countries. The results of reviews will be published, as will be the recommendations of meetings at each stage of the consultative process. These publications will be disseminated as widely as possible, e.g. through input to IRS and other information activities of UNEP. As part of the review process, two or three case studies will be prepared on the costs and benefits (including social ones) of applying the abatement technologies available to specific industrial sectors (see also related activities under human and environmental health (paragraph 214)).

(ii) Other activities

455. Activity B - Preparations are under way to undertake a study of the impact of industrialization processes on environmental health. The study is planned to be carried out by UNIDO, WHO, UNDP, ILO, the World Bank and UNEP, under the aegis of the Environment Co-ordination Board (see paragraph 410).

456. Activity C - The emphasis of decision-making in industrial location is usually put on socio-economic factors such as availability of raw materials, energy and labour and proximity to markets. In many countries, environmental considerations have been neglected, though their inclusion would provide timely warning of problems of resource depletion or deterioration and of pollution which it may be costly to remedy once the industry is established.

457. The assessment of environmental problems of specific industries through Activity A provides information which is relevant to the incorporation of considerations in determining industrial location. Based on the results of this activity, as well as in-depth studies carried out in co-operation with the United Nations and governmental institutions, UNEP expects to work out and promote a methodology for incorporating environmental factors into decision-making on industrial location.

(c) Proposed Fund programme activities

458. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Review of environmental problems of the identified major industrial sectors, and information dissemination thereon (paragraphs 446-454);

(b) Study of the impact of industrialization processes on environmental health (paragraph 455);

(c) Development of environmental guidelines and recommendations to Governments for industrial location (paragraph 457).

6. Major policy issues for the attention
of the Governing Council

459. The Governing Council may wish to focus its policy consideration of this section principally on the following issues:

(a) The planned seminars on alternative patterns of development and life styles (paragraphs 400-401);

(b) The steps taken or planned to encourage international organizations to be more responsive to environmental considerations (paragraphs 409-415);

(c) Planned actions on the rational use of natural resources (paragraphs 421-422);

(d) The proposal for a network of institutions involved in the development of environmentally sound and appropriate technologies (paragraphs 429-435);

(e) The report on the outcome of the consultative meeting on the environmental problems of specific industries and proposals for future activities in this area (paragraphs 442-454).

D. OCEANS

1. Summary of the Level One overview

(a) Marine pollution 177/

460. Oceans, which cover 71 per cent of the earth's surface, have been used indiscriminately as waste receptacles. Their sheer size has led to the belief that they had an infinite waste receiving capacity, and that therefore the anthropogenic impact would be insignificant. This mistaken notion might have been less serious if wastes introduced into the oceans could be quickly dispersed and diluted into the full volume of the oceans and degraded to less harmful components. But physical, chemical and biological processes do not work that

177/ For a detailed overview, see UNEP/PROG/4 (1976).

rapidly in the sea, and accumulations of waste and their unfavourable environmental consequences are often localized. Consequently, floating substances, such as oil and litter, can be seen in virtually all the world's oceans. The critical ocean pollutants are metals, persistent organic chemicals, petroleum hydrocarbons, radionuclides and solid wastes. These enter the marine environment through rivers, atmospheric transport followed by washout with rain, ocean dumping and coastal discharges. With the exception of some constituents of which precise measurements has long been possible, e.g. certain radionuclides, little is known about the world-wide distribution of critical pollutants.

461. Several organizations of the United Nations, including the United Nations, IMCO, FAO, UNESCO, WMO, WHO and IAEA, system deal with various aspects of marine pollution. Increasingly, these agencies are working in concert through joint groups and programmes, often with UNEP's encouragement; the activities of the Joint Group of Experts on Marine Pollution (GESAMP), in which the above organizations are represented, deserve special mention. 178/

462. Despite these activities of the system, those of intergovernmental and non-governmental organizations and national activities, there are still a number of inadequacies in knowledge and action:

(a) Inadequacies in knowledge relating to:

- (i) Marine ecosystem alteration due to input of pollutants or restructuring of the environment;
- (ii) Sub-lethal effects of individual pollutants and mixtures of pollutants on marine organisms;
- (iii) Interaction of sub-lethal effects of pollutants with environmental effects on marine organisms;
- (iv) Coastal water quality criteria for marine organisms, sea bathing and protection of human health;
- (v) Effects of bioaccumulation on living marine resources;
- (vi) Detoxification mechanisms in marine organisms acting on such substances as metals;

(b) Inadequacies in action:

- (i) International and regional conventions for the control of pollution from:
 - Shore-based sources, including river discharges
 - Atmospheric emissions
 - Exploration and exploitation of the sea-bed and its subsoil;
- (ii) A baseline survey of critical pollutants in the water, biota and sediments of the world oceans, and in the principal entry routes (rivers, coastal outfalls, atmosphere and ships), to enable trends to be recognized;
- (iii) Education and training of skilled analysts, researchers and marine scientists in the environmental and ecological field, especially for the developing countries;
- (iv) Technical assistance in developing countries in existing technologies for pollution abatement;
- (v) Improvements in the quality and consistency of marine pollution data and improved systems of exchange of related information.

178/ For a detailed survey of the activities of Governments, United Nations agencies, and intergovernmental and non-governmental organizations, see UNEP/PROG/5 and 6 (1976) and UNEP/GC/60.

(b) Living marine resources 179/

463. The natural stocks of animals and plants in the sea constitute one of the major renewable resources of the world, and the only one based on the natural production of an ecosystem that is still relatively undisturbed and unmanaged. They are important because of their utilization as food and other products, and as parts of ecosystems in which basic biological production takes place.

464. Over-exploitation in some areas has reduced fish stocks sharply. Some other resources, such as marine turtles and whales, have also decreased significantly and in some cases are approaching extinction; in such cases over-exploitation has reduced the rate of renewal of the resources to the point of collapse. Man has caused other adverse changes in the marine environment: pollution threatens the survival of fish, reptiles, birds, mammals and invertebrates, particularly when young and vulnerable, and also reduces the value of marine products, so that they may constitute a hazard to human health. The restructuring of the marine environment (e.g. by dredging for gravel) may permanently displace resources or valuable habitats for marine life.

465. FAO carries a major responsibility for monitoring marine resources and dissemination of research information and data. The United Nations Conference on the Law of the Sea is endeavouring to develop adequate international legislation for the conservation of living marine resources. Other international bodies with related activities include IUCN and the International Whaling Commission (IWC). 180/

466. The following inadequacies in knowledge and action require particular attention:

(a) Inadequacies in knowledge relating to:

- (i) The functions, inter-relationships and interactions of individual resources, habitats and ecosystems;
- (ii) The nature of the fauna of the deep oceans and of all benthic fauna not exploited by man;
- (iii) Environmentally sound ways of optimal exploitation of living marine resources;

(b) Inadequacies in action:

- (i) Adequate policies for the management, conservation and rational utilization of living marine resources;
- (ii) An international network for the exchange of fundamental resource data, research findings and management experience;
- (iii) Effective international agreements for the protection of living marine resources, especially mammals;
- (iv) Training and education programmes for decision-makers, technologists and resource users at all levels to increase awareness of the importance and potential benefits of marine resource management.

2. Objectives, strategies and concentration areas

467. The Governing Council endorsed the objective and strategies for the area of oceans at its third 181/ and, for living marine resources, fourth sessions. 182/ These have been summarized elsewhere. 183/

179/ For a detailed account of the overview, see UNEP/PROG/4 (1976).

180/ For a detailed survey of the activities of Governments, United Nations agencies, and intergovernmental and non-governmental organizations, see UNEP/PROG/3 and 5 (1976) and UNEP/GC/60.

181/ Decision 29 (III), para. 1.

182/ Decision 50 (IV), para. 3.

183/ UNEP/GC/INFORMATION/1, sect. III.D.1 (a) (i) and (ii) and (b) (i) and (ii).

468. At its fourth session the Governing Council agreed that the following parts of the ocean programme should be considered concentration areas:

(a) Continued support for the United Nations Conference on the Law of the Sea in respect of environmental aspects;

(b) Implementation of the comprehensive action plan for the protection of the Mediterranean;

(c) Initiation of preparatory work towards similar arrangements for other important regional seas, particularly the Persian Gulf, the Caribbean and the West African coastal region. 184/

469. Also at its fourth session, the Governing Council took two additional decisions relating to oceans. It decided 185/ that immediate steps were necessary to protect from pollution the marine area adjacent to Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, authorized the Executive Director to take action in that regard, and approved the action of the Government of Kuwait in proceeding with the preparatory work for convening a regional conference to reach an agreement for co-operation on the protection of the marine environment from pollution. It also 186/ requested the Executive Director to approach the International Whaling Commission to express satisfaction at recent advances in stock management, to urge increased efforts to control exploitation of whales and to re-emphasize the Council's concern with the conservation of whales as a global renewable resource.

3. Activities

(a) Introduction

470. The Level One overviews were prepared in two parts, marine pollution and living marine resources. However, the Governing Council has given its support to drawing up proposals for a solution-oriented programme for marine pollution and living marine resources under two different headings, global and regional seas programmes; it is easier in this way to convey the interrelated concepts of environmental assessment, environmental management and supporting activities at both the global and the regional scale, and to concentrate attention on particular parts of the oceans where the problems are most acute. Although the activities are set out under the agreed division of global and regional programmes, they are so presented that it should be possible to relate this account to the inadequacies identified under the different grouping at Level One.

(b) Global programme

(i) Marine pollution

471. The activities are:

Activity in the concentration area

Activity A - Continued support for the Law of the Sea Conference in respect of the environment (paragraph 472).

Other activities

Activity B - Enhancing ongoing programmes for understanding the sources, pathways and the effects of marine pollution on the marine environment (paragraph 473).

Activity C - Enhancing the technical capabilities of developing countries to help them implement international agreements for the protection of the marine environment (paragraph 474).

184/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

185/ Decision 58 (IV).

186/ Decision 59 (IV).

472. Activity A - Action in regard to the Law of the Sea Conference is reported in the section on environmental law (paragraph 640). 187/

473. Activity B - This activity is being carried out under a number of existing global programmes of agencies within and outside the United Nations system. 188/ Several of the most important of these programmes are largely the concern of UNESCO/IOC, and the scope for UNEP co-operation in them has been discussed during UNESCO/UNEP joint programming 189/ and in subsequent consultations. The programmes concerned are:

(a) UNESCO/IOC Global Investigation of Pollution in the Marine Environment (GIPME), which provides a framework for regional programmes, workshops on scientific aspects of marine pollution;

(b) UNESCO/IOC/WMO Integrated Global Ocean Stations System (IGOSS), which is dealt with under GEMS (paragraph 43);

(c) UNESCO's programme on river inputs to oceans;

(d) The UNEP/UNESCO programme on the establishment of a world register of rivers discharging into the oceans, which is also dealt with under GEMS (paragraph 43).

A number of other agency programmes and activities relate to marine pollution activities (see paragraph 491).

474. Activity C - This activity will be achieved through technical assistance, including training, extended to developing countries in co-operation with other agencies concerned. An example is the joint UNEP/IMCO activity to assist developing countries which have accepted the international agreements for the protection of the marine environment against pollution from ships and by dumping of wastes; the basis for co-operation between IMCO and UNEP in this area was agreed on during the joint programming which took place in November 1976. 190/

(ii) Living marine resources

475. The activities are:

Activity A - Development and implementation of a global plan of action for living marine resources (paragraphs 476-481).

Activity B - Development and implementation of education and training programmes for marine parks managers and other conservation experts, and information campaigns for the public (paragraph 482).

Activity C (1977-1982) - Support for improved conservation and management of marine ecosystems, and particularly of those habitats critical to the survival of threatened living marine resources (paragraphs 483-485).

Activity D (1977-1979) - Submission to the Governing Council at its seventh session of proposals for controlling the excessive exploitation and destruction of living marine resources (paragraphs 486-487).

187/ FP/0504-74-01/Global/Internal/46,217/V'74-XII'76/GC/40 and 96.

188/ FP/0501-73-08/Global/IOC/77,250/41,750/I'74-VI'78/GC/23/Add.2;
FP/0501-74-09/Global/IOC/WMO/357,500/285,500/I'75-XII'76/GC/40;
FP/0501-75-02/Global/IMCO/169,500/60,000/I'75-IX'76/GC/68; FP/0501-75-03/Global/IAEA/93,750/
18,750/VI'75-X'77/GC/68; FP/0502-73-01/Global/FAO/139,950/108,000/III'74-XII'77/GC/23;
FP/0502-73-02/Global/FAO/179,994/130,000/I'74-XII'77/GC/23.

189/ UNEP/GC/89, annex I, paras. 3 and 4.

190/ UNEP/GC/89, annex I, para. 15.

476. Activity A - In co-operation with UNEP, FAO has made significant contributions towards the assessment, conservation and management for sustained productivity of living marine resources, especially fish, and is now involved in promoting conservation of marine mammals and turtles, 191/ IUCN has undertaken a number of surveys of threatened marine species to assess their status and ways of restoring their depleted populations, 192/ and UNESCO is concerned with the establishment of marine biosphere reserves. 193/

477. Through the FAO Advisory Committee on Marine Resources Research (ACMRR), FAO and UNEP have reviewed aspects of research, monitoring, restoration, conservation, management and sustained productivity programmes for marine mammals (i.e. cetaceans, sirenians, seals and marine otters).

478. A working party of ACMRR prepared its final report in January 1977, containing a draft global plan of action for marine mammals, giving priority to the restoration and development of depleted populations with the aim of sustained productivity. 194/ The draft plan will need to be harmonized with relevant agreements arrived at by the Law of the Sea Conference, and will be subject to consultations with Governments, organizations and institutions.

479. Implementation of the marine mammals plan of action, suitably adapted as a result of consultations, will begin in 1978. Though the timing of the activities associated with the plan is uncertain, implementation is bound to take a long time. The plan is expected to involve pilot projects, some of which will need to be global, to show the practicability and economic advantages of sound management of marine mammals.

480. IUCN is preparing a global marine conservation programme for safeguarding threatened living marine resources and their habitats. 192/ To implement this programme, WWF has launched a campaign, "The Seas must Live", to raise \$10 million. IUCN/WWF hope to stimulate intergovernmental bodies and the public to take necessary action. The UNEP/FAO plan of action for marine mammals contributes to a particular segment of the IUCN/WWF marine conservation programme. Further development of the two activities will be closely co-ordinated.

481. Support will be given to the restoration of marine turtles for sustained productivity. This will be undertaken in collaboration with IUCN, FAO, and UNESCO. By 1978 or 1979, it should be possible to incorporate field demonstrations of good conservation practices within the action plans for the Persian Gulf, East Asian Seas and the Red Sea (paragraphs 505, 510-511 and 512-513) and the environmental management programmes for the Caribbean and the South Pacific (paragraphs 659-660).

482. Activity B - Training and education are essential supporting measures for conservation and wise management of living marine resources. Wherever feasible training programmes in the field of wildlife and protected areas (see paragraph 384) will be supported to include courses on the conservation and management of marine ecosystems. Training, education and public information will also be provided as part of UNEP's activities in the regional actions referred to in the previous paragraph.

483. Activity C - This involves undertaking regional surveys of existing, proposed and potential marine national parks, biosphere reserves and other protected areas during the next five years. This review, which also serves actions under Wildlife and protected areas (see paragraphs 380-392), will be undertaken in collaboration with FAO, UNESCO, IUCN and other organizations. Its purpose will be to assess the status of marine ecosystems, identify areas for which conservation steps may be necessary, indicate the need for improved management of established protected areas and for additional protected areas, and develop research, monitoring and training in biosphere reserves.

191/ FP/0502-75-01/Global/FAO/181,300/127,000/IV'75-IX'77/GC/68 and 96.

192/ RA/1103-75-04/Global/IUCN/3,098,500/1,555,000/V'75-XII'77/GC/61 and 62.

193/ FP/0605-74-02/Global/UNESCO/78,000/49,000/IV'74-XII'76/GC/61 and 62.

194/ FP/0502-74-01/Global/FAO/379,236/273,500/VIII'74-I'77/GC/61 and 62.

484. A meeting in Tokyo in May 1975 reviewed progress made in establishing marine national parks and other protected areas throughout the world. 195/ Preliminary surveys of marine parks and reserves have been undertaken by UNEP and IUCN, and proposals made to Governments for new ones in the Mediterranean, the Red Sea, the Persian Gulf and the northern Indian Ocean; 196/ the survey reports were reviewed at a meeting in Tehran in March 1975.

485. At the invitation of the Government of Tunisia, and as part of the Mediterranean action plan, an expert group meeting was convened in Tunis on 12-14 January 1977, in co-operation with IUCN, FAO and UNESCO and Mediterranean Governments, to review the status of protected marine and coastal wetland ecosystems and their living resources in that region (paragraph 502), and to adopt a plan of action for the conservation and management of marine and coastal ecosystems in the Mediterranean, including the establishment of a network of marine national parks and other protected areas. 197/ It was agreed that the scientific papers reviewed by the expert consultation would be fully updated for the Intergovernmental meeting on marine and coastal national parks to be convened by UNEP later in 1977. Similar activities are planned for the Caribbean, the Gulf of Guinea, the Red Sea, the Persian Gulf, South East Asia and the South Pacific, based on surveys to be undertaken during the next five years with a view to providing baseline information on living marine resources and identifying the needs for conservation measures.

486. Activity D - This activity will extend to the seventh session of the Governing Council. By then, in co-operation with FAO, UNESCO, IUCN and IWC, UNEP will have:

(a) Undertaken a review of the status and effectiveness of international agreements relating to the conservation and management of living marine resources;

(b) Submitted the results of that review for consideration by Governments at the seventh session of the Governing Council;

(c) Prepared proposals for new or amended agreements to fill any gaps in existing legislation.

487. This action will take account of UNEP's repeatedly-expressed support for a ten-year moratorium on commercial whaling, and the Governing Council's concern, most recently voiced at its fourth session, for the conservation of whales as a global renewable resource. 198/ 199/

(c) Regional seas programmes

(i) General

488. Since broadly the same approach is to be adopted in all regional seas, though with appropriate adaptations to take account of each area's ecological, social, economic, cultural and political characteristics, the activities will be grouped together, and progress towards their realization will be reported under each region in turn.

489. The activities are:

Activity A - In consultation with the Governments and other organizations concerned, the development of draft action plans for a number of the regional seas identified as priority areas within a framework agreed to at an interagency meeting on regional

195/ FP/1103-75-03/Global/IUCN/135,300/40,300/1'75-VII'75/GC(III)/SC.2/CRP.1.

196/ FP/1103-75-01/Northern Indian Ocean/IUCN/53,500/27,200/XI'74-IX'75/GC(III)/SC.2/CRP.1.

197/ FP/0503-75-03/Mediterranean/IUCN/61,500/48,900/1'75-1'77/GC/68 and 96.

198/ FP/0605-74-01/Global/Internal/297,781/297,781/1'74-V'77/GC/40 and 96.

199/ Decision 59 (IV).

seas, which was convened by UNEP in Paris, in June 1976, and attended by representatives of the Ocean Economics and Technology Office in the United Nations Department of Economic and Social Affairs, UNESCO, IOC, FAO, IMCO, WHO, UNIDO, IAEA and UNEP. 200/

Activity B - Securing the approval of Governments for such plans.

Activity C - Implementation of the action plan with the co-operation of the Governments concerned. Where appropriate, pilot projects will be initiated with catalytic and financial support from UNEP, the costs being gradually transferred to the Governments concerned.

Activity D - Encouragement to Governments of the area to assume full responsibility for continued action for the protection of the marine environment.

490. The timetable for achieving the four Activities for the marine regions will vary from one sea to another; in the Mediterranean, Activity C is now being undertaken and Activity D could be completed in 1978, while for all other regions only Activity A is being pursued and most will complete Activity C between 1980 and 1981, and Activity D later. However, conditions are suitable in some areas for Activity C to be started earlier.

200/ Guidelines and principles were set at the Paris meeting for the development of a comprehensive action plan for the protection of regional seas through environmentally sound development. These guidelines, which provide an outline of the contents of the action plan, may be summarized as follows:

Environmental assessment component

- Evaluation, research, monitoring and information exchange, leading to a report on the state of the marine environment and its living resources
- Assessment of the impact on the marine environment of development policies for industry, agriculture, urbanization, fishing, maritime transport, exploitation of mineral and energy resources, tourism, etc.;

Environmental management component

- Arrangements for the elaboration and conclusion of legal instruments to protect the marine environment
- Preparation of guidelines for environmentally sound development and for the protection of the marine environment, to be included in general guidelines for environmental management of the regional sea and the areas adjoining it
- Arrangements for the control of pollution by oil and other harmful substances
- Plans for the management and conservation of living resources (e.g. marine parks, aquaculture);

Supporting measures

- Identification of technical assistance, training, education and information exchange needs
- Provision of information for the general public.

The meeting also identified the steps which could be taken towards the development and approval of such action plans, for example, interagency consultations, periodic reviews of the situation, fact-finding missions, feasibility studies and the convening of workshops, expert groups and intergovernmental meetings.

491. Many United Nations bodies and specialized agencies, acting sometimes in co-operation with UNEP, are engaged in work which contributes to the purposes of the foregoing activities. These programmes include:

- (a) GIPME;
- (b) The FAO regional programme for marine living resources in the Mediterranean;
- (c) IGOS;
- (d) The WHO water quality programme;
- (e) The IOC/WMO programme of studies on coastal transport of marine pollution;
- (f) The coastal area development programme of the Department of Economic and Social Affairs;
- (g) The IMCO programme for the control of pollution from ships and dumping.

492. The following is a brief account of progress made in implementing activities for each of the regional seas in which UNEP is active.

(ii) Regional seas approved as concentration areas

The Mediterranean

493. Implementation of the action plan approved by the Governments of the region is proceeding satisfactorily. 201/ The interrelationship of the many meetings involved is shown in Figure 2, Meetings relevant to the Mediterranean Action Plan.

494. With regard to environmental assessment, the seven pilot research and monitoring projects in the action plan are being implemented, and the first results will be reviewed in 1977. 202/ Seventy research centres from fifteen Mediterranean countries are taking part in these activities. To enable the centres to participate fully in the assessment part of the action plan, many are being assisted through training programmes on the operation and maintenance of sophisticated analytical instruments, the organization of intercalibration exercises and the provision of common maintenance services. 203/ Guidelines on assessment functions are being prepared and a directory of all research centres in the region has been compiled; both exercises are undertaken to assist participating centres. Results already available from the research and monitoring projects indicate new areas for research, including the possibility of UNESCO developing work in marine ecosystem modelling.

495. Also within the environmental assessment component, UNESCO has a programme on the role of sedimentation in the pollution of the Mediterranean Sea, (see also paragraph 316 (a) ECE, FAO, IAEA, UNESCO, WHO and WMO are co-operating with UNEP in making a survey of land-based sources of pollution, including surveys of rivers around the Mediterranean. The survey will provide information that will assist the coastal States in their negotiations to develop a protocol to control pollution from land-based sources (see paragraph 500).

496. Within the environmental management component of the action plan, the most important activity is the development of what has come to be known as the Blue Plan, in which Governments, United Nations agencies, intergovernmental and non-governmental organizations will co-operate. The Blue Plan comprises prospective studies including systematic surveys of major developments and environmental protection activities carried out in the region, to be based on collection of data from countries using a common methodology so as to

201/ FP/0503-75-01/MED 1/Internal/1,713,700/111'75-X11'78/GC/68 and 96.

202/ FP/0503-75-06/MED V/IOC/WMO/43,500/40,500/V11'75-X11'75/GC/68; FP/0503-76-03/MED V/IOC/WMO/323,100/216,000/V11'76-V11'78/GC/96; FP/0503-75-08/MED V11/WHO/66,000/40,000/V111'75-V'76/GC/68; FP/0503-76-05/MED V11/WHO/424,000/280,000/V1'76-X1'78/GC/96; FP/0503-75-07/MED V111/FAO/1,405,565/1,244,000/X'75-X11'77/GC/68; FP/0503-76-09/MED X111/IAEA/IOC/350,000/160,000/X'76-111'78/GC/96.

203/ FP/0503-75-04/MED IV/IAEA/IOC/208,500/174,500/1'76-V11'78/GC/68.

MEETINGS RELATIVE TO THE MEDITERRANEAN ACTION PLAN

Legend:

- Intergovernmental (Solid line)
- Expert Consultations (Dashed line)

Key Meetings and Events:

- 1970:** Working Party on Marine Pollution in Relation to the Protection of Living Resources (GFCM, Rome).
- 1971:** Working Party on Marine Pollution in Relation to the Protection of Living Resources (GFCM, Rome).
- 1972:** UN Conference on the Human Environment (Stockholm, June).
- 1973:** UN Inter-governmental Working Group on Marine Pollution (Second Session) (Ottawa, Dec).
- 1974:** UN Conference on Living Resources in the Mediterranean (Rome, Feb).
- 1975:** UN Conference on the Protection of the Mediterranean Sea (Barcelona, Jan).
- 1976:** UN Conference on the Protection of the Mediterranean Sea (Barcelona, Feb).
- 1977:** UN Conference on the Protection of the Mediterranean Sea (Barcelona, Jan).

facilitate comparability and assessment, as well as exchange of information among countries. An Intergovernmental meeting of the Mediterranean coastal States which met in Split, Yugoslavia from 31 January to 4 February 1977 agreed to ask the Executive Director to initiate the first phase of the Blue Plan in accordance with a set of general principles, organizational principles, long-term objectives and immediate objectives. It also recommended a number of activities to achieve these objectives, and agreed on methods of implementation, the phasing of the project and the geographical coverage. The Blue Plan will be administered by a small co-ordinating unit which will work with national focal points appointed by each Government to co-ordinate Blue Plan activities within the country. The over-all direction of the Blue Plan will be ensured through periodic intergovernmental meetings. The cost of the first phase of the project will amount to about 1.5 million dollars of which, according to a scale of contribution agreed at the Split Meeting, 50 per cent will be provided by the countries, 25 per cent by UNEP and 25 per cent by other agencies. The meeting requested Governments to inform the Executive Director before 29 April 1977 of their formal commitment to participate in and contribute to the financing of the project.

497. The Split Meeting also agreed to initiate a Priority Actions Programme addressed to the implementation of sound environmental management practices in selected sectors using knowledge and experience available in the region. The meeting also identified certain priority areas requiring immediate action, namely protection of soil, management of water resources, management of marine living resources, human settlements, tourism, and soft technologies for energy including solar energy. The Priority Actions Programme will also be administered by a co-ordinating unit working closely with the national focal points referred to above. The question of financing the Programme will be subject to further consultations with the Governments. It was agreed, however, that Governments could utilize parts of their national or regional indicative planning figures under the UNDP programme to support activities within the Priority Actions Programme.

498. Also within the environmental management component, the regional oil combating centre in Malta, established in co-operation with IMCO, 204/ was officially inaugurated on 11 December 1976.

499. Environmental management includes the legal aspects of the action plan. The Executive Director has made interim arrangements with the Government of Spain for it to act as the depositary of the convention and protocols adopted by Governments of the region; as part of the arrangements, a small interim secretariat unit 205/ has been set up in Spain to expedite the signature and ratification of these instruments. Since the Conference of Plenipotentiaries of the Coastal States of the Mediterranean Region for the Protection of the Mediterranean Sea (2-16 February 1976), two more States (Tunisia and Yugoslavia) and the Commission of the European Communities have signed the convention; only four of the eighteen Mediterranean Governments have not so far signed the convention. With the help of the secretariat unit, the legal instruments should enter into force in 1978.

500. With the assistance of WHO, good progress has been made in the preparatory work for the development of a protocol on the protection of the Mediterranean Sea from land-based sources of pollution. 206/ The first of a series of intergovernmental meetings to develop that protocol will be held in Athens from 7-11 February 1977; this will discuss the principles upon which the protocol should be based.

501. The legal activities also include the publication of a survey of national legislation in the Mediterranean countries for the protection of the marine environment.

204/ FP/0503-76-06/MED XII/IMCO/657,500/537,500/IX'76-XII'78/GC/96.

205/ FP/0503-75-01/MED I/Internal/1,713,000/III'75-XII'78/GC/68 and 96.

206/ FP/0503-75-05/MED II/WHO/45,000/30,000/VII'75-IX'76/GC/68 and 96.

502. Another management activity deals with marine and coastal wetland ecosystems. The aim is to develop guidelines for the establishment and management of representative samples of these ecosystems so that their protection is secured, while their potential for scientific research, fisheries, education, recreation and tourism is simultaneously realized. A meeting to initiate preparations for such guidelines took place in Tunisia from 12-14 January 1977 (paragraph 485). 207/

503. In all these activities, supporting measures (training, information and technical assistance) are being undertaken to strengthen the capability of countries to participate to the full.

504. It is planned to convene an Intergovernmental meeting in Monaco in November/December 1977 to review progress in the implementation of the Mediterranean action plan and to propose further action.

The Persian Gulf

505. In accordance with Governing Council decision 58 (IV), it is planned to convene a conference of plenipotentiaries of the coastal States of the region in October 1977 to consider a draft action plan for the development and protection of the marine environment and coastal areas. The draft action plan will be based upon the work of meetings of experts designated by Governments and agencies. The first meeting, co-sponsored by UNEP and the Department of Economic and Social Affairs, was held from 6 to 10 December 1976 in Kuwait and made recommendations on the scientific and economic development aspects of the action plan; this group used the findings of a UNEP-sponsored interagency mission which visited the area earlier in 1976. The second working group, which dealt with the legal aspects, took place in Bahrain from 24 to 29 January 1977; this meeting had before it a draft of a framework convention which had been prepared by UNEP on the basis of an interagency consultation (UNEP, WHO, FAO, UNESCO and the Ocean Economics and Technology Office) which took place in Nairobi from 1 to 5 November 1976, a draft protocol on co-operation in cases of pollution emergencies prepared by IMCO at the request and with the support of UNEP, and other background papers related to the protection of its marine environment. 208/ Another expert meeting is planned for June 1977 to put the draft framework convention and a protocol in final form for submission for signature to the conference of plenipotentiaries, as well as to finalize other parts of the draft action plan for approval by Governments.

The Caribbean

506. A comprehensive programme for the Caribbean, encompassing all the priority areas of the environment programme, is being developed under the functional task of environmental management, with participation of the ECLA/Caribbean Development Co-operation Committee (CDCC) (see paragraph 659). 209/ The programme includes a component for the protection of the marine environment against pollution. A workshop on the scientific aspects of marine pollution in the Caribbean was organized in co-operation with FAO and IOC in Trinidad on 13 December 1976. 210/ The outcome of this workshop, which recommended the implementation of seven research projects, will serve as a basis for a programme of marine pollution, research and monitoring in the Caribbean which will form part of relevant agency activities (see paragraph 491).

207/ FP/0503-75-03/MED 111/IUCN/61,500/48,900/1'75-11'77/GC/68 and 96.

208/ FP/0503-75-09/West Asia/UNESA/UNDP/157,062/137,062/111'76-X11'76/GC/68;
FP/0504-76-01/Regional/Internal/75,000/IX'76-VIII'77/GC/96.

209/ FP/1000-77-0-/Caribbean/ECLA/588,500/553,500/IV'77-III'78/GC/96.

210/ FP/0503-76-07/Caribbean/IOC/FAO/61,500/40,000/VII'76-III'77/GC/96.

The Gulf of Guinea

507. A UNEP-organized mission visited 14 countries around the Gulf of Guinea and adjacent coastal areas from April to July 1976. On the basis of its consultations and discussions with the Government authorities concerned, the mission included in its report recommendations for the development of a convention to protect the marine environment against pollution, guidelines for the prevention and abatement of environmental pollution and a programme against soil erosion.

508. The report of the UNEP mission is now with Governments and agencies for their comments, as a step towards the preparation of a draft comprehensive action plan for the protection of this regional sea. An important input to this plan will be made by a scientific workshop on marine pollution in the area, which IOC plans to organize during the second half of 1977, probably in Abidjan.

509. UNEP convened an interagency consultation in Nairobi from 1 to 5 November 1976 to consider draft principles which could serve as a basis for the development of a marine protection convention as recommended by the mission. 211/ The meeting proposed that UNEP should, in consultation with other agencies and on the basis of the mission's report, begin developing a comprehensive action plan, which would include a component on legal aspects; it also agreed that a meeting of legal experts designated by Governments of the area should take place in the second half of 1977 to discuss the legal component. A number of actions are planned in preparation for this meeting: surveys of relevant international agreements and national legislation, studies of options for regional action, and complementary scientific, economic, technical and background studies.

(iii) Other regional seas

East Asian seas

510. A scientific workshop organized in April 1976 in Penang in co-operation with FAO and IOC to develop a research and monitoring programme for the East Asian Seas 212/ recommended four regional and 20 sub-regional projects to be implemented in the region. The report of the workshop has been distributed to Governments with a request for comments on the various projects proposed and an indication of their willingness and ability to participate in any of them. At the same time consultations are in hand between UNEP, IOC and FAO to develop further those projects which are known to receive the support of the Governments concerned.

511. All these activities will eventually be co-ordinated in a draft comprehensive plan for the protection of the marine environment in the East Asian Seas against pollution, which will be presented for consideration to a meeting of Governments of the region.

The Red Sea

512. A comprehensive plan for the protection of the Red Sea against pollution adopted in January 1976 by the Governments concerned 213/ includes a draft convention, and Government representatives have requested the Arab League to convene a conference of plenipotentiaries to sign it. The plan also includes a research programme and the establishment of a special fund to secure the protection of the marine environment in the Red Sea.

211/ FP/0504-76-01/Regional/Internal/75,000/IX'76-VIII'77/GC/96.

212/ FP/0501-75-01/Asia and the Pacific/IOC/FAO/79,000/61,000/IV'75-IV'76/GC/68 and 96.

213/ FP/0503-75-02/Africa and West Asia/ALECSO/101,190/56,790/III'75-III'76/GC(III)/SC.2/CRP.1.

513. At the request of the Arab League Educational, Cultural and Scientific Organization (ALECSO), UNEP has agreed to participate in this programme, contributing to the costs of training scientists and technologists who will operate the marine research and monitoring stations and to the provision of equipment, and carrying out a survey of living marine resources in the Red Sea, especially turtles and dugongs, with a view to restoring their populations for sustained productivity. 214/

The Pacific

514. Consideration is being given to the development of a draft action plan for the development and protection of the marine environment in the South Pacific, which will form part of a broader programme of environmental management for the region (paragraph 660).

515. At the request of the countries bordering the South East Pacific, IOC is planning to organize, in co-operation with FAO, a workshop on scientific aspects of marine pollution in this area, probably in Santiago, in mid-1977. UNEP will co-operate in the organization of this workshop which will eventually contribute to the plan for the South Pacific.

(iv) Co-ordination of the regional seas programme

516. As the regional seas programme develops, it becomes increasingly important to ensure co-ordination between its regional components and co-operation with programmes developed for other regional seas by the Governments concerned. It is therefore planned to establish a programme activity centre for the regional seas. In co-operation with all the agencies concerned, it will:

(a) Develop draft action plans for each of the regional seas in accordance with the guidelines and principles for the development of such action plans which were agreed to by the Interagency Meeting on Regional Seas in Paris in June 1976 (paragraph 489);

(b) Arrange for the approval of these draft plans by the Governments concerned in each region;

(c) Follow up and co-ordinate the implementation of the action plans by the Governments concerned, and providing assistance to developing countries where required;

(d) Ensure co-ordination between the action plans adopted for each of the regional seas and those prepared by Governments to protect other regional seas in which UNEP has not yet been directly involved, e.g. the Baltic Sea, the North Sea and the Atlantic.

4. Proposed Fund programme activities

517. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Global programme:

(i) Marine pollution

Global Investigation of Pollution and the Marine Environment (paragraph 473 (a))

River inputs to oceans (paragraph 473 (c))

Technical assistance programme concerning the acceptance by developing countries of international agreements for protection of the marine environment against pollution from ships and by dumping of wastes (paragraph 474);

(ii) Living marine resources

Plan of action on marine mammals (paragraphs 477-479)

Restoration of marine turtles (paragraph 481)

Training, education and information (paragraph 482)

Regional surveys of marine parks (paragraph 483-485)

Preparation of proposals to control destruction of living marine resources (paragraphs 486-487);

(b) Regional programme:

(i) The Mediterranean

Follow up of various activities reported in paragraphs 493-504

(ii) The Persian Gulf

Development of a draft action plan and organization of an intergovernmental meeting (paragraph 505)

Follow up of the recommendations of the intergovernmental meeting (paragraph 505)

(iii) The Caribbean

Follow up recommendations of the scientific workshop (paragraph 506)

Marine activities included in the comprehensive environment management programme (paragraph 506)

(iv) The Gulf of Guinea

IOC study of marine pollution (paragraph 508)

Development of a draft comprehensive action plan (paragraph 509)

Meeting of Government legal experts (paragraph 509)

(v) East Asian Seas

Pilot projects (paragraph 510)

Marine activities related to environmental management and organization of an intergovernmental meeting (paragraph 511)

(vi) The Pacific

Preparatory work for the development of the oceans part of an environment management programme for the Pacific, including scientific workshops for certain sub-regions of the Pacific (paragraphs 514-515)

(vii) Programme activity centre (paragraph 516)

5. Major policy issues for the attention of the Governing Council

518. The Governing Council may wish to focus its policy consideration of this section principally on the following issues:

(a) The increased prominence which it is proposed to give to the better protection, management and utilization of living marine resources (paragraphs 475-487);

(b) The adoption of guidelines for action plans for all marine regions, comprising an assessment and supporting activities component (paragraph 489);

(c) The progress being made in each of the regional seas and the Executive Director's intention to establish a programme activity centre to guide future work (paragraphs 493-516).

E. ENERGY

1. Summary of the review on the impact of production and use of energy on the environment 215/

519. It has been estimated that man's per capita use of energy has doubled during the past 30 years, and current trends indicate that consumption will grow faster in the future.

520. Some environmental problems associated with energy production and use are already of great importance. Others may be of significance if present trends in energy production continue. Public concern about the environmental impacts has grown recently, and there is clearly a need to examine rationally the environmental aspects of energy production and use.

521. The fossil-fuels energy system consists of several steps: extraction, transport, conversion and use. Each step has some environmental impacts. Extraction of coal can affect land, air, water and human health, while the extraction of oil, particularly from offshore wells, can have impacts on marine ecosystems. Marine transport of oil and oil products has been significant in causing degradation of the marine environment. When fossil fuels are burnt in conventional power stations, different types of pollutants are emitted into the atmosphere (mainly particulates, sulphur and nitrogen oxides, carbon monoxide and hydrocarbons) which can have serious effects on the environment. Such pollutants cause minor changes in the meteorological conditions on a local and regional scale, and are expected to cause some global changes in the long term. Waste heat discharged from thermal power plants can have an appreciable effect on aquatic life locally, and perhaps on climate at the regional and global scale.

522. Radioactivity from the decay products of nuclear fission is a problem unique to nuclear energy. Thermal pollution from nuclear power stations is slightly higher than that from fossil fuel stations. Despite rigid safeguards, the possibility exists that hazardous concentrations of radionuclides may enter the environment at some stage in the nuclear fuel cycle; this fear has been the main cause of growing public opposition to the expansion of nuclear power.

523. Of the renewable energy sources (geothermal, solar, tidal, wind, wave, hydro-power, sea-thermal power, biogas and synthetic fuels), hydro-power production has the most marked environmental impact; lesser effects arise from exploiting geothermal or solar sources.

524. The United Nations system has been involved in nearly every aspect of energy production. Apart from conventional fuels and technologies, attempts have been made for many years to foster interest in less conventional forms of energy, such as geothermal, solar, wind and tidal energy. The activities of UNDP, the Centre for Natural Resources, Energy and Transport, UNESCO and some of the regional commissions are well documented. WMO is studying meteorological aspects of siting and operating nuclear power plants. IAEA has undertaken extensive studies of the peaceful uses of nuclear energy in different fields, and formulated measures for safety control and protection of the environment against radioactive hazards.

525. UNEP has the task of initiating studies to define the impact on the local, regional and global environment of the extraction, processing, transport, conversion, transmission and use of various forms of energy, and of demonstrating the feasibility of harnessing renewable energy sources to improve the human environment in rural areas of developing countries.

^{215/} See UNEP/GC/61/Add.1. This review was requested by the Governing Council and has been considered as an overview on the subject. However, no survey of relevant activities has been undertaken, nor have inadequacies in action and knowledge been identified.

2. Objectives, strategies and concentration areas

526. The Governing Council endorsed the objectives and strategies for energy at its third session; 216/ these have been summarized elsewhere. 217/

527. At its fourth session, the Governing Council agreed that the following should be considered concentration areas:

- (a) Up-dating the review of the impact of energy production and use on the environment 218/ and following up on issues identified in it;
- (b) Establishment of three rural energy centres, in Asia, Africa and Latin America; 219/
- (c) Examination with IAEA of the impact of nuclear energy on the environment.

528. The Governing Council at its fourth session decided that, in relation to the first and third concentration areas, a series of in-depth studies should be undertaken of the impact of extraction, conversion, transport and use of all significant energy sources. Furthermore, the Council endorsed the Executive Director's proposal to support research on the methods of reclamation of strip-mined areas, the environmental impact assessments of hydroelectric power and non-traditional renewable sources of energy, and on the conservation of energy at the points of production and end use. 220/

529. The Governing Council further requested the Executive Director to accelerate work in the second concentration area, to support national and regional projects aimed at harnessing renewable energy sources, and to study the possibility of establishing a programme activity centre for such activities. 221/

3. Activities

530. The following activities all relate to the approved concentration areas:

Activity A (1977-1980) - In-depth studies of the environmental impacts of extraction, conversion, transport and use of all energy sources so as to update the review on the environmental impact of production and use of energy, thus providing Governments with a comparative assessment of energy options (paragraphs 531-533).

Activity B - Support for research in the reclamation of coal-mined areas, for the study of the environmental impacts of hydro-power and other renewable energy resources and for the enhancement of energy conservation at the points of production and end use (paragraph 534).

Activity C - Establishment of experimental centres to harness locally available renewable sources of energy to satisfy the needs of small rural communities in some developing countries in an environmentally, economically and socially acceptable way (paragraph 535).

Activity D - Provision of technical assistance to developing countries who wish to harness locally available renewable sources of energy for rural development (paragraphs 536-537).

531. Activity A - Three expert panels will be convened in 1977 and 1978 to review detailed reports on the environmental impacts of extraction, conversion, transport and use of energy sources. The first panel will deal with fossil fuels, the second with nuclear energy and the third with renewable sources of energy. The participation of bodies within

216/ Decision 29 (III), para. 1.

217/ UNEP/GC/INFORMATION/1, sect. III. E. 1 (a) and (b).

218/ Issued as UNEP/GC/61/Add.1 and summarized in sect. 1 above.

219/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

220/ Decision 50 (IV), para. 6.

221/ Decision 60 (IV), para. 1 and 2.

the United Nations system - notably the Centre for Natural Resources, Energy and Transport and the regional commissions - will be sought in planning and carrying out the first and third of these panels; for that on nuclear energy, see paragraph 532. The technical reports for these panels will take into account the results of international and regional conferences and of documents prepared by other organs, as well as studies on the environmental aspects of energy production and use carried out by ECE.

532. With respect to nuclear energy, UNEP will contribute a review of the environmental impact of nuclear energy to the International Conference on Nuclear Power and Its Fuel Cycle organized by IAEA (Salzburg, 1977). The panel of experts to discuss the environmental impacts of nuclear energy will be convened in collaboration with IAEA. UNEP has co-operated with IAEA in studies on the disposal of high-level and alpha-bearing radioactive wastes and the feasibility of establishing regional centres for the processing of nuclear fuels. 222/

533. The review of the environmental impacts of production and use of energy will be updated in 1979, drawing on the work of the three panels and other relevant studies. A comparative assessment to assist Governments in policy-making will be carried out in 1979 and submitted to the Governing Council in 1980.

534. Activity B - Detailed surveys of the on-going activities of the United Nations system and other organizations in the fields of reclamation of coal-mined areas, environmental impacts of hydro-power and other renewable sources of energy and of energy conservation will be carried out in 1977 in order to establish research priorities. The results of the Katowice seminar on the environmental aspects of strip mining of coal (see paragraph 320 (b)) will be drawn upon in respect of the first of these topics.

535. Activity C - Feasibility studies have been carried out for the establishment of experimental centres in Sri Lanka and Senegal. Technical assistance has been granted to the Government of Sri Lanka to set up an experimental centre in which wind, solar and biogas potential will be harnessed in an integrated way to provide electric current to a sector of a village, to be used for lighting and pumping water. 223/

536. Activity D - UNEP is studying requests from some developing countries for assistance in developing projects to harness renewable sources of energy. Emphasis has been placed on solar, wind and biogas energy systems, and henceforth more attention will be given to small hydro-power schemes - for which experience gained from a recent study tour of China will be useful - and to ways of minimizing the adverse environmental impact arising from the exclusive dependence of rural communities in developing countries on firewood as a source of energy (see also paragraph 270 (a)).

537. The study requested by the Governing Council at its fourth session (paragraph 529) requires careful preparation with United Nations organizations and specialized agencies and other bodies concerned; a major issue is the place of such a programme activity centre within the context of UNEP's activities in, for example, environmentally sound technologies and industry and environment. In addition, UNEP participated in the study requested by the General Assembly 224/ on the feasibility of establishing an international energy institute within the United Nations system. The Executive Director feels that he should not prejudge the outcome of this study and whatever tasks and responsibilities might eventually be entrusted to such an institution, and for this reason too considers it advisable to postpone his presentation on the possibility of establishing a programme activity centre to deal with renewable energy resources until the sixth session of the Governing Council.

222/ FP/0700-75-01/Global/IAEA/417,800/73,200/I'76-I'78/GC/96.

223/ FP/0302-76-04/Asia and the Pacific/Government of Sri Lanka/233,500/191,000/XI'76-XI'78/GC/96.

224/ Resolution 3362 (S-VII), sect. III, para. 2.

4. Proposed Fund programme activities

538. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Support for three expert group panels: fossil fuels, renewable resources, nuclear energy (paragraphs 531-533);
- (b) Surveys relating to the reclamation of coal-mined areas, environmental impacts of hydro-power and other renewable sources of energy, and energy conservation (paragraph 534);
- (c) Experimental rural energy centres (paragraph 535);
- (d) Support for national and regional actions aimed at harnessing renewable energy sources (paragraph 536).

5. Major policy issues for the attention of the Governing Council

539. The Governing Council may wish to focus its policy discussion of this section principally on the proposed plan for updating the review of the impact of extraction, conversion, transport and use of energy on the environment (paragraphs 531-533).

F. NATURAL DISASTERS

1. Summary of the Level One overview 225/

540. A natural disaster is an extreme physical event, causing physical, social and economic damage. There are many types of natural disasters, the most important being those due to drought, 226/ tropical cyclones, floods and earthquakes.

541. Effects on man and his environment include: damage to buildings and services; the occurrence of epidemics; destruction of vegetation cover, ecosystems and wildlife; soil erosion; the loss of genetic resources; salinization of arable land; pollution of water supplies; destruction of crops, animals and food reserves leading to malnutrition and greater human susceptibility to disease; and economic losses through effects on commercial activity, public revenue, employment opportunities and services.

542. The response of the international community, including the United Nations system, was until recently oriented mainly towards relief and rehabilitation, but it has been recognized that the consequence of natural disasters are so serious and extensive that greater attention should be given to disaster preparedness and prevention, including mitigation and early warning, to protect both man and his environment.

543. Disaster prevention and mitigation is directed towards the long-term reduction of risk and involves measures to reduce the impact of extreme natural events. These include land-use planning, structural protection measures, building regulations, etc. Disaster preparedness, which includes such elements as warning systems and evacuation plans, is directed towards emergency action. Natural disaster preparedness and mitigation should be part of the long-term planning of all countries, especially in disaster-prone areas.

225/ For a detailed account of the overview, see UNEP Report No. 3 (1977).

226/ Disasters caused by drought are considered under Arid and semi-arid lands ecosystems, paras. 255-272.

544. The organizations of the United Nations system most deeply concerned with natural disasters are UNDRO, WMO, UNESCO, WFP and the regional commissions. UNDRO plays a central role in disaster relief activities. WMO is primarily concerned with natural disasters caused or aggravated by meteorological phenomena; the World Weather Watch programme, including the tropical cyclone project, is a major example of a WMO activity in this area. UNESCO is active in the field of seismology, volcanology and studies of tsunamis and floods. WFP provides emergency food assistance to the victims of natural and man-made disasters, and helps in the reconstruction of devastated areas. 227/

545. The following major inadequacies in knowledge and action have been identified:

(a) Inadequacies in knowledge relating to:

- (i) The effects of man-made structures and prevailing land-use practices, particularly in disaster-prone areas, of the loss of coral reefs, mangrove swamps and coastal forest belts, of draining swamps and wetlands, and of deforestation;
- (ii) Adequate building designs and use of suitable building materials in disaster-prone developing countries;
- (iii) The precise location of disaster-prone areas and the need for risk assessment and systematic vulnerability analyses;
- (iv) Forecasting and prediction techniques for floods, tropical cyclones, storm surges and possibly earthquakes;
- (v) Flood plain management;
- (vi) Methodologies for assessment of social, economic and environmental impacts of disasters;

(b) Inadequacies in action:

- (i) Co-ordinated programmes of post-disaster survey and analysis;
- (ii) Programmes of public awareness and education to promote disaster preparedness and prevention at all levels;
- (iii) Inclusion of natural disaster preparedness and mitigation in national development planning;
- (iv) Expansion and improvement of monitoring systems for prediction and warning in disaster-prone countries.

2. Objectives, strategies and concentration areas

546. The Governing Council endorsed the objectives and strategies for the area of natural disasters at its third session, 228/ and at its fourth emphasized the following elements: "early warning, prevention and mitigation of natural disasters, including support for the formulation of the international strategy for disaster prevention". 229/ The approved objectives and strategies have been summarized elsewhere. 230/

227/ For a detailed survey of the activities of Governments, United Nations agencies, and intergovernmental and non-governmental organizations, see UNEP Report No. 3 (1977).

228/ Decision 29 (III), para. 1.

229/ Decisions 50 (IV), para. 5 (d), and 61 (IV), para. 1.

230/ UNEP/GC/INFORMATION/1, sect. III. F. 1 (a) and (b).

547. Also at its fourth session the Governing Council authorized the Executive Director to accelerate, between the fourth and fifth sessions of the Governing Council, programme activities relating to disaster prevention, mitigation and control. This decision 231/ also requested the Executive Director to:

(a) Consider and submit to the Governing Council at its fifth session proposals for increasing the allocation in 1977 for the priority area of natural disasters;

(b) Introduce disaster prevention dimensions into other areas of the environment programme, especially those relating to human settlements and health.

548. At its fourth session the Council also agreed that support for activities meant to ensure early warning and community preparedness for natural disasters should be a concentration area. 232/

549. Consultations have been conducted with the agencies concerned in order to respond to the request of the Governing Council. UNEP/UNDRO joint programming took place in September 1976, 233/ and UNEP convened an interagency consultation with UNDRO, WHO, WMO and UNESCO in Geneva in December 1976 to review the programme in the area of natural disasters in the light of the decisions of the Governing Council and to advise the Executive Director on how to respond to the Governing Council request to increase the allocation in 1977 for the priority area of natural disasters.

3. Activities

550. The activities are:

Activities within the concentration area

Activity A (1976-1980) - Compiling and dissemination of information on existing techniques of disaster prevention, mitigation, preparedness and early warning systems to disaster-prone countries, and research to improve these techniques and their application (paragraphs 551-553).

Activity B (1977-1980) - Monitoring of potentially disastrous natural phenomena (paragraph 554).

Activity C (1977-1980) - Assistance to developing countries in applying known techniques of disaster prevention, mitigation and preparedness (paragraph 555).

Other activities

Activity D - Introduction of disaster prevention dimensions into other areas of the environment programme, especially those related to human settlements and health (paragraph 556).

(a) Activities within the concentration area

551. Activity A - UNDRO, in co-operation with UNEP, UNESCO, WHO and WMO, has prepared a series of monographs on the current state of knowledge of various aspects of disaster prevention and mitigation. 234/ Monographs on volcanological, hydrological, meteorological, seismological and land-use aspects have been or shortly will be published; further ones are being prepared on health, legal, public information and engineering aspects. 235/ The complete set will summarize the present knowledge of disaster prevention for direct application by disaster-prone developing countries.

231/ Decision 61 (IV), paras. 2 and 3.

232/ UNEP/GC/57, para. 4 and decision 47 (IV) sect. 1, para. 4.

233/ See UNEP/GC/89, annex 1, para. 11.

234/ FP/2002-74-02/Global/UNDRO/17,500/15,500/1-VI'75/GC/40 and 61.

235/ FP/1200-76-02/Global/UNDRO/154,000/135,000/IX'76-XII'77/GC/96.

552. WMO's programmes on operational hydrology and tropical cyclones include improvement of forecasting techniques and early warning systems. Within these programmes, UNEP is participating in the improvement of early warning systems in Central America 236/ and the Bay of Bengal. 237/ Plans are under way to ensure that full advantage is taken of the new possibilities offered by polar-orbiting and geostationary satellites to improve cyclone warning systems.

553. Also relevant to the improvement of existing techniques are the efforts of UNESCO to encourage research in seismology, earthquake engineering, engineering geology, volcanology, etc. GARP, which aims at improving understanding of the natural phenomena that cause disasters, is also relevant. UNESCO, in co-operation with UNDRO, is developing multidisciplinary methods for risk and vulnerability analysis and studies of the technical, social and economic aspects of prevention measures and early warning systems in relation to seismic and volcanic disasters; a joint Committee on the Assessment and Mitigation of Earthquake Risk is presently being established to advise UNESCO and UNDRO on preparations for a long-term inter-disciplinary research programme to be undertaken as a joint venture of UNESCO and UNDRO for the promotion of international co-operation in this field. 238/

554. Activity B - The actions relevant to this activity are described under GEMS (paragraph 55).

555. Activity C - UNDRO has a technical co-operation programme to assist developing countries in applying existing knowledge to their needs in disaster prevention and mitigation. The programme includes regional seminars for policy-makers and technicians responsible for disaster management. Through its tropical cyclone project WMO, in co-operation with UNEP and supported by UNDP, is assisting developing countries to improve their early warning systems and hence disaster prevention and preparedness. UNESCO assists developing countries in zoning of disaster prone areas, volcanic surveillance, protection against landslides and avalanches, and by training specialists.

(b) Other activities

556. Activity D - Actions envisaged include:

(a) Guidelines for post-disaster settlements planning and reconstruction. These will complete the guides previously prepared by UNDRO in co-operation with UNEP, which dealt with problems related to the planning, building and management of new settlements in order to minimize vulnerability to natural disaster risk; 239/

(b) A study with the Centre for Natural Resources, Energy and Transport on the water management problems which arise from drought conditions and floods.

4. Proposed Fund programme activities

557. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Publications on existing techniques for disaster prevention and mitigation (paragraph 55);

(b) Improvement of early warning systems (paragraph 552);

(c) Assistance to developing countries in application of existing techniques for disaster prevention, including early warning and mitigation (paragraph 555);

(d) Post-disaster settlements planning and reconstruction (paragraph 556 (a));

(e) Study of water management problems arising from drought and flood situations (paragraph 556 (b)).

236/ FP/1200-75-01/Latin America/WMO/122,000/79,000/11'76-X11'77/GC/61 and 96.

237/ FP/1200-75-02/Asia/WMO/163,000/74,000/1-X11'76/GC/61 and 68.

238/ Resolution 12.21 of the Intergovernmental Conference on the Assessment and Mitigation of Earthquake Risk, Paris, 10-19 February 1976.

239/ FP/0101-73-10/Global/UNDRO/100,000/85,000/111'74-IX'75/GC/61.

5. Major policy issues for the attention of the Governing Council

558. The Governing Council may wish to focus its policy discussion of this section on the proposed concentration on improvement of early warning systems and application of existing techniques for disaster prevention (paragraphs 552 and 555).

Chapter IV

SUPPORTING MEASURES

559. The supporting measures are environmental education, environmental training, information and technical assistance. A section of this chapter is devoted to each topic, education and training being reported on separately for the first time. Supporting measures are needed to ensure that the functional tasks of assessment and management, including law, can be carried out successfully. For example, environmental education promotes environmental awareness amongst the younger generation, thus ensuring a sympathetic reception for environmental management measures; information for the general public can do the same for the current generation; training is needed for those who have to undertake assessment and management tasks; and technical assistance to developing countries is often needed to enable them to undertake environmental activities at the national and international levels.

A. ENVIRONMENTAL EDUCATION

1. Objectives, strategies and concentration areas

560. At its third session, the Governing Council approved the objectives and strategies for environmental education, 1/ which have been summarized elsewhere. 2/

561. At its fourth session, the Council agreed that the following should be concentration areas:

- (a) Implementation of the programme on environmental education jointly with UNESCO;
- (b) Establishment of a programme activity centre for environmental education and training. 3/

2. Activities

562. The activities are:

Activities in the concentration areas

Activity A (1977-1978) - Continued collaboration with UNESCO, in co-operation with other agencies of the United Nations system, leading to the Intergovernmental Conference on Environmental Education (1977), and post-conference policy implementation activities (paragraphs 563-565).

Activity B (1977-1983) - Establishment of regional programme activity centres on environmental education and training, beginning with one in Africa on an experimental basis (paragraphs 566-567).

Other activities

Activity C - Continued encouragement to action by Governments, organizations in the United Nations system, intergovernmental and non-governmental organizations, etc. in matters related to environmental education (paragraph 568).

1/ Decision 29 (III), para. 1.

2/ UNEP/GC/INFORMATION/1, sect. IV. A. 1 (i) and (ii) (education and training are not treated separately in this summary).

3/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

(a) Activities in the concentration areas

563. Activity A - Much has already been accomplished jointly by UNESCO and UNEP in preparation for the Intergovernmental conference to be held in Tbilisi (USSR) in October 1977; for example 4/ surveys of needs and resources for environmental education, papers on trends and issues, an international workshop (Belgrade, October 1975), regional seminars, a quarterly bulletin (CONNECT) and seventeen pilot projects. The latter were mounted to test the recommendations of the Belgrade workshop and examine such aspects as environmental education in primary and secondary schools, environmental education for adults, the rural sector and teachers, research and information systems for environmental education, and regional programmes of environmental education for contiguous countries.

564. The Intergovernmental conference is being jointly organized by UNEP and UNESCO, with the support of other organizations, notably IUCN. The conference will consider all elements of the programme undertaken in the preparatory phase and a draft action plan for the development of environmental education globally, regionally and nationally. The material prepared for the conference, and its outcome, should assist the preparation of the Level One review on Environmental education and training which is to be available for the sixth session of the Governing Council.

565. Post-conference actions may include:

- (a) Development of new pilot projects as necessary, and evaluation of on-going ones;
- (b) Research into curricula, methodologies, educational materials, etc. on a regional basis;
- (c) Establishment of environmental education institutional networks in each region;
- (d) Updating the survey of needs and resources for environmental education;
- (e) Assistance to Governments in implementing recommendations of the international conference regarding planning and programming environmental education and allocation of resources.

566. Activity B - A feasibility study on the establishment of a programme activity centre for environmental education and training in Africa was approved in 1976, 5/ and has led to the setting up of the centre, on an experimental basis and in close co-operation with UNESCO. The principal functions of the centre will be:

- (a) Stimulating action to integrate environmental concerns in educational practice in the formal and non-formal educational sectors;
- (b) Establishment of a network of co-operating educational institutions within the region for the development of environmental education.

567. Similar experimental regional programme activity centres are likely to be set up in Western and Eastern Europe (1978-1979) to test the means of exchange of experience between centres in developed and developing countries. Other regional centres may be established (1981-1983). All of these centres are expected to work closely with the respective UNESCO regional offices and to co-operate with each other, especially in the exchange of information and experience. The establishment of a global programme activity centre to co-ordinate the work of the regional centres will be considered in due course, in consultation with UNESCO.

4/ FP/0301-75-01/Global/UNESCO/4,036,900/1,952,000/XI'74-XI'77/GC/61 and 96.

5/ FP/0301-75-09/Africa/Internal/79,640/79,640/XII'75-VIII'77/GC/61 and 96.

(b) Other activities

568. Activity C - A number of other actions have been or will be stimulated by UNEP, or undertaken without its financial involvement but within the framework of the strategies for environmental education (though some also serve training purposes). The following are examples of such recent, on-going or planned activities:

(a) Environmental education at the school level:

(I) Preparation of a source book for environmental education at the school level for Arab countries, 1975-1976 (ALECSO/UNEP); 6/

(II) Pilot Seminar on Environmental Education Methodology in East Africa, Mombasa, Kenya, July 1974 (IUCN/UNEP); 7/

(b) Environmental education at higher levels:

(I) Conference on environmental education at post-secondary level, Rungsted, Denmark, June 1974 (OECD and the Centre for Educational Research and Innovation (CERI));

(II) Programme of environmental education for students from developing countries, 1975 - continuing (UNEP/Washington University); 8/

(c) Non-formal environmental education:

(I) Preparation of a workers' education manual and audio-visual aids for workers' education, 1975 - continuing programme (ILO, with the co-operation of UNEP and in consultation with UNESCO); 9/

(II) Development of non-formal environmental education programmes in rural areas, particularly in connexion with water supply systems, 1975 - continuing (UNICEF);

(III) New programme of integrated rural development and environmentally oriented education for rural communities, 1976 - continuing (FAO);

(IV) Organization of Seminar on Trade Union Attitudes, Policies and Programmes in relation to the Environment - planned (ILO in collaboration with UNEP);

(V) Inclusion, where necessary, of environmental components in on-going educational (and training) programmes of various social groups (e.g. rural community) and professional groups (e.g. architects, physical planners) (ILO, other agencies, in collaboration with UNEP);

(d) Environmental conservation education:

(I) Seminar on education for conservation of renewable natural resources in high school curricula, Cordoba, Argentina, October 1975 (IUCN, Foresta Institute and Cordoba University);

6/ FP/0301-73-06/Middle East/ALECSO/82,500/60,000/I'74-XII'75/GC/61.

7/ FP/0301-73-15/Africa/IUCN/74,650/35,231/III-XI'74/GC/23.

8/ FP/0301-75-07/Global/WU/258,697/200,250/VII'75-VII'77/GC/96.

9/ FP/0301-75-06/Global/ILO/72,500/48,000/V'75-XII'76/GC/96.

- (II) Co-ordinated action programme in conservation of natural resources involving the introduction of environmental aspects into the curricula of agricultural institutions, 1975 - continuing project (FAO, UNESCO);
- (e) Environmental health education:
 - (I) Environmental education programme for environmental health, health manpower development, family health and public information, 1975 - continuing project (WHO, UNESCO);
 - (II) Curricula, syllabi and materials for specialists concerned with atmospheric pollution, 1976 - continuing (WHO, UNESCO);
- (f) Environmental management education:
 - (I) Programme for managers in environmental matters - planned (Management Development Programme of the ILO);
 - (II) Publication of "Resource Materials for Environmental Management and Education", July 1976 (the Massachusetts Institute of Technology (MIT), UNEP, the Centre for Industrial Studies, Geneva (CEI)); 10/
 - (III) Environmental Management Education Programme using the MIT/CEI publication, 1977 - planned programme (CEI, UNEP, UNESCO); 11/
- (g) Environmental education of engineers:
 - (I) International expert meeting on environmental aspects of engineering education, June 1974, Paris (UNEP/UNESCO); 12/
 - (II) Regional seminar on environmental training of practising civil engineers, Kuala Lumpur, Malaysia, April 1975 (UNEP/UNESCO); 13/
 - (III) Pilot projects on engineering education in the Philippines and Venezuela, 1974-1977 (UNEP/UNESCO); 14/
 - (IV) International programme in environmental education and training of engineers, 1976-1978 (UNEP/UNESCO); 15/
- (h) Environmental science education:
 - (I) Symposium on Environmental Science in Developing Countries, April 1974 (ICSU, SCOPE, UNEP); 16/
 - (II) Seminar/Workshop on Environmental Science Education for Teacher Educators in French-speaking Central Africa, July 1975 (the Science Education Programme for Africa (SEPA), UNEP). 17/

10/ FP/0301-73-02/Global/Internal/48,041/48,041/IX'73-IX'74/GC/23 and 61.

11/ FP/0301-76-02/Global/CEI/420,000/275,000/I'76-XII'77/GC/61 and 96.

12/ FP/0301-73-08/Global/UNESCO/47,600/30,627/XI'73-XII'74/GC/23.

13/ FP/0301-73-13/Global/UNESCO/41,500/41,674/I'74-V'75/GC/68.

14/ FP/0301-74-09/Global/UNESCO/186,000/140,000/IX'74-II'76/GC/61 and 96.

15/ FP/0301-76-05/Global/UNESCO/800,000/600,000/X'76-III'78/GC/96.

16/ FP/0301-73-03/Global/SCOPE/108,500/83,500/XI'73-IV'74/GC/23.

17/ FP/0301-74-11/Africa/SEPA/27,819/18,819/I'75-VII'75/GC/61.

(i) Environmental law:

Introduction of environmental law into the curricula of legal studies and the development of materials for use in universities for teaching international and national environmental law - planned activity 1977-1979 (probably (paragraph 644) with UNESCO);

(j) Evaluation of the impact of environmental education at graduate level:

Workshop for the exchange and evaluation of information and experience on the impact of graduate level environmental education, to focus mainly on developed countries (proposed activity).

3. Proposed Fund programme activities

569. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Programme for environmental education (paragraphs 563-565);
- (b) Regional programme activity centres (paragraphs 566-567);
- (c) Non-formal environmental education, particularly the seminar on trade union attitudes, policies and programmes in relation to the environment (paragraph 568 (g) (iv));
- (d) Environmental management education (paragraph 568 (f));
- (e) Environmental education of engineers (paragraph 568 (g));
- (f) Evaluation of environmental education impact at graduate level (paragraph 568 (j)).

4. Major policy issues for the attention of the Governing Council

570. The Governing Council may wish to focus its policy discussion of this section principally on the following issues:

- (a) Preparations for the intergovernmental conference on environmental education (paragraph 563);
- (b) Plan to develop the regional programme activity centres in environmental education and training (paragraphs 566-567).

B. ENVIRONMENTAL TRAINING

1. Objectives, strategies and concentration areas

571. The objectives and strategies for environmental training were endorsed by the Governing Council at its third session; 18/ these have been summarized elsewhere. 19/

572. At its fourth session, the Governing Council agreed that the following should be concentration areas:

(a) Establishment of a programme activity centre for environmental education and training;

(b) Conduct of, and support for training programmes on a regional basis, particularly of personnel from developing countries involved in planning and management of various aspects of development which have important environmental dimensions. 20/

18/ Decision 29 (III), para. 1.

19/ UNEP/GC/INFORMATION/1, sect. IV. A. 1 (a) and (b) (education and training are not treated separately in this summary).

20/ UNEP/GC/57, para. 4 and decision 47 (IV), sect. 1, para. 3.

573. Also at its fourth session 21/ the Governing Council authorized the Executive Director "to pursue the study of problems and matters related to the environment on which Governments of developing countries would be interested in receiving training and technical assistance, requested by the General Assembly in its resolution 3326 (XXIX) of 16 December 1974, and to present his recommendations based on that study to the Governing Council at its fifth session".

2. Activities

574. All the activities fall within or, as in the case of A, are directly relevant to the concentration area; they are:

Activity A (1977) - Completion of the study of problems related to the environment on which Governments of developing countries would wish to receive training assistance (paragraph 575).

Activity B (1977-1983) - Establishment of regional programme activity centres on environmental education and training, beginning with one in Africa on an experimental basis (paragraphs 576-577).

Activity C - Continuation of training activities relating to particular disciplines, especially those which are part of the environment programme, and development of a fellowship programme in collaboration with interested donor organizations, the regional commissions and UNDP (paragraphs 578-580).

575. Activity A - The Council will receive information on the interest shown by developing country Governments in training in matters relating to the environment in an addendum to this report (see also paragraph 617).

576. Activity B - The implementation of this activity is reported under Activity B of environmental education (paragraphs 566-567).

577. Also relevant to this activity is the International Centre for Training in Environmental Sciences for Spanish-speaking people at Madrid, 22/ established in co-operation with the Government of Spain and in consultation with UNESCO and ECLA. The centre is the focus for a group of specialized institutions in Spain and other Spanish-speaking countries. It provides training courses and studies in environmental sciences, disseminates information and generally assists the work of other institutions in the system in training specialists in biocological, sociocultural and socioeconomic fields. The centre has already started organizing and carrying out training courses.

578. Activity C - An in-house study has been undertaken of the training components of environment programme activities with the purpose of determining the extent to which training (and education) are already supported as essential elements in environmental assessment and management and how these could be more effectively programmed and co-ordinated through the co-operation of Governments and United Nations institutions.

579. One of the mechanisms by which training for specialists will be pursued - especially as a form of assistance to developing countries - is the creation of a UNEP fellowship programme. At present, fellowships are granted as training components of many of the programme activities 23/ in which the Fund of UNEP is involved, and through funds available to UNEP's regional representatives in developing regions to support the costs of travel of experts from those regions to participate in group activities of environmental significance; agencies and non-governmental donors will continue to be encouraged to support such activities. The fellowship programme will be further elaborated after consultations during 1977 with the regional commissions and other United Nations bodies in the course of joint programming, and with non-governmental donors.

21/ Decision 68 (IV), para. 1.

22/ FP/0301-75-08/Global/Government of Spain/4,444,300/937,900/IX'75-XII'77/GC/61 and 96.

23/ FP/0301-73-01/Africa/IDEP/2,226,492/1,100,000/IX'73-XII'77/GC/61 and 95; FP/0301-76-03/Asia/ADI/180,000/140,000/I'76-XII'77/GC/61 and 96; FP/0301-76-04/Middle East/IMCO/50,000/50,000/I-XII'77/GC/95; FP/0301-76-06/Global/UNESCO/1,772,000/250,000/IX'75-VIII'78/GC/61 and 96; FP/0301-76-07/Global/UNIDO/40,000/35,000/III-IV'75/GC/61 and 96.

580. The following is a list of current or planned activities, most of which are supported by the Fund of UNEP, which involve the provision of training in:

(a) Monitoring and evaluation:

- (i) All fund-assisted activities in GEMS have integral training components (paragraphs 35-55);
- (ii) MARC deals with the training programmes for monitoring and evaluation (paragraph 56);

(b) Information exchange (IRS and IRPTC):

- (i) A number of workshops and seminars have been held in all regions of the world (1975-1976); and a second one is planned for North Africa and West Asia in March 1977 (paragraph 75);
- (ii) Fellowships have been provided to enable focal points to participate in IRS (paragraph 76);
- (iii) Training will be given to national staff to support IRPTC, 1977-1978 (see paragraph 96 (b));

(c) Human settlements:

- (i) Human settlements managers training courses, 1975-1977 (UNESCO) 24/ (paragraph 190);
- (ii) Support for training of physical planners and architects beginning 1977 (UNESCO and perhaps others) (paragraph 191);

(d) Human and environmental health:

- (i) Training in the control of environmental contaminants in food in East Africa (WHO/FAO), 1975 - continuing 25/ (paragraph 217);
- (ii) Training programmes on integrated control of schistosomiasis, malaria and cotton pests, 1977-1980 (WHO/UNDP) (paragraphs 243, 246 and 249); 26/
- (iii) Training Programme in Pest Management Systems for species of importance in agriculture and human health 1976-1978 (ICIPE/UNEP/FAO) 27/ (paragraph 244);

(e) Terrestrial ecosystems:

- (i) A study will be completed by July 1977 on: "Information, education and training for the Sudano-Sahelian Zone" (EMASAR) (paragraph 263); 28/
- (ii) Long-term direction of arid lands programmes will stress training-planned programme (EMASAR/Desertification Conference/UNEP) (paragraph 271);
- (iii) Regional training courses in management of tropical woodlands and forests - planned programme (UNESCO/FAO) (paragraph 287);
- (iv) Establishment of a water resources management centre for the purpose of training and research is under study - planned action (paragraph 341);

24/ FP/0104-75-07/Global/UNESCO/448,250/327,250/1'75-X11'77/GC/61 and 96.

25/ FP/0107-75-02/Africa/FAO/WHO/1,351,728/731,948/V11'75-X11'77/GC/61 and 96.

26/ FP/0108-76-03/Middle East/Asia/FAO/1,843,184/249,000/1'77-X11'78/GC/61 and 96,
FP/0108-76-04/Africa/FAO/1,849,184/150,000/1'77-X11'78/GC/61 and 96.

27/ FP/0108-76-02/Global/ICIPE/1,477,900/762,400/X'76-X11'78/GC/61 and 96.

28/ FP/1101-76-05/Africa/Near and Middle East/FAO/864,300/511,744/X'76-1V'78/GC/61
and 96.

- (v) Eight training courses in microbial resource conservation were held in 1975/1976. (UNESCO/ICRO/UNEP) (paragraph 364);
- (vi) Training courses are taking place in plant genetic resource conservation, 1975 - continuing programme (IBPGR/UNESCO/UNEP) (paragraph 365);
- (vii) Training is and will be provided in wildlife and national park management - continuing programme (FAO/UNESCO/IUCN) (paragraph 384);
- (f) Environment and development:
Training in association with reviews of the environmental problems of specific industries - planned programme (paragraph 454);
- (g) Environmental law (planned activities):
 - (i) Simultaneous survey of selected universities in Africa, Asia, South America and the Caribbean (1977-1978) to identify those institutions which have the capacity to introduce environmental law into the curricula of their legal studies (UNEP/UNESCO) (paragraph 631);
 - (ii) Introduction of environmental law into the curricula of legal studies and the development of materials for use in universities for teaching international and national environmental law, 1977-1979 (UNEP/probably UNESCO) (paragraph 644).

3. Proposed Fund programme activities

581. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Regional programme activity centres (paragraph 576);
- (b) Training programmes for environmental specialists from developing countries (paragraph 577);
- (c) Fellowship programme (paragraph 579).

4. Major policy issue for the attention of the Governing Council

582. The Governing Council may like to focus its policy consideration of this section principally on the following issue:

- The effectiveness of the training activity in various parts of the environment programme in meeting the needs of developing countries (paragraphs 575 and 580).

C. INFORMATION

1. Objectives, strategies and concentration areas

583. The Governing Council endorsed the objectives and strategies for information at its third session 29/ and amended the strategy at its fourth. 30/ The approved objective and strategy have been summarized elsewhere. 31/

584. At its fourth session, the Governing Council agreed that the stimulation of a flow of information designed to intensify public awareness and appreciation of environmental issues should be a concentration area. 32/

29/ Decision 29 (III), para. 1.

30/ Decision 50 (IV), para. 5 (f).

31/ See UNEP/GC/INFORMATION/1, sect. IV. B. 1 (a) and (b).

32/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

585. Also at that session, the Governing Council expressed appreciation of progress made by the secretariat in the field of communication to Governments, but nevertheless was also deeply concerned about the lack of any regular flow of sufficient information to Governments about on-going activities and results of projects by the Fund of UNEP, and especially about the inadequate circulation given to project progress reports containing information that could be of use to Governments or regions other than those where the activities were carried out. The Council endorsed the intention of the Executive Director to develop the field of public information, including the publication of a quarterly journal, and requested him to report fully on progress made in this area to the Council at its fifth session. 33/

2. Activities

586. All the following activities are relevant to the approved concentration area:

Activity A - Strengthened publishing capability, including regular monthly, bi-monthly, quarterly and annual publications serving different audiences (paragraphs 587-592).

Activity B - Wider use of news agencies, syndication services, television and news film organizations, etc., for disseminating material (paragraphs 593-595).

Activity C - Co-operation with other members of the United Nations system in integrating relevant information on the environment into their activities (paragraph 596).

Activity D (1977) - Re-orientation of World Environment Day activities, as recommended by the report of the evaluation team (paragraphs 597-600).

Activity E - Incorporation of information components in UNEP-supported projects (paragraphs 601-603).

587. Activity A - The monthly UNEP newsletter for general readership has been restyled and improved under the new title of UNITERRA. The first issue appeared in August 1976, containing news of general environmental concern, substantive articles on various environmental topics, and items on UNEP programme activities. UNITERRA is issued in English, French and Spanish; publication in other languages is under consideration. At the end of 1976, the first of a series of quarterly newsletters on the work of the United Nations Habitat and Human Settlements Foundation appeared as an insert distributed with UNITERRA. 34/

588. A revised version of Report to Governments also appeared in August 1976 as a bi-monthly publication. It contains details of the financial status of the Fund and Government contributions received up to publication date, information on projects signed since the previous issue, details of reports arising out of projects and how they can be obtained, and lists of forthcoming UNEP meetings and published information material. Detailed technical reports by IRS, GEMS, and IRPTC are provided from time to time in supplements. It is proposed to extend the value of this publication through the addition of the new UNEP/GC/FUND PROJECTS/ - series, which will be issued with Report to Governments from February 1977 onwards; this series will give Governments more information on projects initiated, on progress in their implementation and on completed projects.

589. It is hoped that the first issue of the UNEP quarterly journal 35/ will be available as a co-production with an international publishing house about the time of the fifth session of the Governing Council. Initially, the journal will appear in English, French and Spanish, but later it is hoped to introduce other languages. The target audience is decision-makers, the academic community and well-informed sectors of the public.

33/ Decision 47 (IV), sect. I, paras. 12 and 13.

34/ FP/0303-76-01/Global/Internal/108,100/108,100/111'76-V'77/GC/61 and 96.

35/ FP/0303-76-02/Global/Internal/720,000/720,000/1'77-X11'79/GC/61 and 96.

590. The first issue of the Annual Review 36/ was published early in 1977 in three languages (10,000 copies in English, 5,000 each in French and Spanish). The review will become an annual item of information output, giving a summarized account of the substantive activities and plans of UNEP and reproducing the annual state of the environment report. Its target audience is member Governments, the environmentally-interested inside and outside the United Nations, and the mass media.

591. Articles have been carried in scientific journals such as AMBIO and the New Scientist on UNEP issues. It is intended to secure wider publication after suitable editing, of appropriate material presented to the Governing Council; the Level One overviews and the report on the environmental impact of the production and use of energy on the environment 37/ are examples of the kind of items which are being so treated. The Fund of UNEP has also made provision for the preparation of technical reports based on the outcome of Fund-supported activities. In addition, supplements on selected environmental themes will be produced similar to the supplement on UNHHSF which appeared with the November 1976 issue of UNITERRA.

592. Some major publications have appeared as a result of projects. Eric Eckholm's book, "Losing Ground", 38/ which the Worldwatch Institute published with financial support from UNEP, has been notably successful in drawing attention to the scale of natural resource destruction, especially of soils and vegetation in the developing world. An English edition has been followed by editions in French, Japanese, Italian and Dutch; arrangements for versions in Spanish, Russian and other languages are now being negotiated. Preparations are well advanced for the publication of a second book by the same author on human health and the environment. A Worldwatch pamphlet on the subject of desertification is being written by Lester Brown as an input to the Conference on Desertification, due to take place at the end of August 1977. A new book is also under preparation by Barbara Ward, probably under the title "The Conserving Society". 39/

593. Activity B - New channels of distribution are being developed to increase the flow of information so as to promote greater public awareness and arouse consciousness on matters of environmental concern throughout the world. These channels include the news pool of agencies of non-aligned nations, which distribute news on the environment through its network to more than 30 news agencies in developing countries; UNEP is in constant touch with the pool through TANJUG, the Yugoslav agency. Successful syndication arrangements have also been made with television news agencies and commercial feature agency outlets reaching television organizations, newspapers and periodicals in many parts of the world. These included "GEMINI" and "VISNEWS". In addition, a number of press conferences have been arranged, dealing with a wide range of environmental matters.

594. A profile of non-governmental organizations in the environment field, carried out for UNEP by the Non-governmental Organizations' Environment Liaison Board, was completed early in 1977. 40/ The survey has given UNEP valuable information about the activities of public participation groups and has led to more two-way contact between UNEP and non-governmental organizations.

595. Materials for the media have increased in quantity and variety. The Fact Sheet series, which is kept up to date, provides an introduction to the problems with which the environment programme is concerned. These sheets are supplemented by Information Papers with background for media use, feature articles and special briefing materials on actions undertaken or proposed by UNEP. An audio-visual unit has been set up 41/ to operate an environmental

36/ FP/0303-75-07/Global/Internal/40,800/40,800/1'76-IV'77/GC/61 and 96.

37/ UNEP/GC/61/Add.1.

38/ FP/1101-75-01/Global/Worldwatch Institute/87,000/68,300/11'75-11'76/GC/96.

39/ FP/0303-77-02/Global/IIED/125,000/75,000/1'77-VI'78/GC/96.

40/ RB/0303-75-01/Global/ELB/100,000/72,500/VIII'75-VIII'76/GC/96.

41/ FP/0303-77-01/Global/Internal/261,670/261,670/1'77-XII'78/GC/96.

briefing centre at UNEP headquarters and encourage the production and dissemination of audio-visual materials. Information on environmental matters is also made available through the following co-operative information efforts supported by UNEP:

(a) "Earthscan" (thematic media information programme) of the International Institute of Environment and Development (IIED); 42/

(b) The World Environment Day poster campaign through the Environment Liaison Centre, Nairobi; 43/

(c) The World Environment Report produced by the United Nations Association of the United States of America. 44/

596. Activity C - Initial success achieved with recorded material for radio broadcasts on environmental issues has led to the development of more outlets. This is a result of the policy of co-ordinating information output with other organizations in the United Nations system, as recommended by the Joint United Nations Information Committee and endorsed by ACC. Co-operation with the United Nations system will be further developed under the aegis of the Joint Committee, with UNEP initiating and co-ordinating information action on environmental themes, such as nuclear power and in the context of the conferences on these subjects, water and desertification.

597. Activity D - During 1976 a four-man team of communication experts undertook an evaluation of World Environment Day. The team recommended that more effort should be made to find outlets for the material in developing countries, that closer co-operation should be established with local and regional media organizations, and that the subjects chosen for World Environment Day should in future be capable of arousing world-wide interest; the relatively narrow themes chosen in the past might inhibit local initiative.

598. During the 1976 operation, for which the theme was "Water - A Vital Resource for Life", an 11-minute colour film was distributed to 213 television stations in 100 countries. Subsequent showings on television created widespread interest, especially in Asia and the United States. Because of the further demands for this film in connexion with the Water Conference, versions have been prepared in Dutch, French, Japanese, Spanish and Arabic. These were distributed through the United Nations Office of Public Information and the United Nations Information Centres. A public television "spot" on the same topic was distributed to 250 stations globally. In the United States millions of people saw the water "spot" via the ABC and CBS television networks.

599. Some 7,000 World Environment Day media packs were produced in three languages and distributed to the mass media and publications by non-governmental organizations on a global basis. The World Environment Day radio tapes, produced in six languages, 45/ were broadcast by many radio stations. The special World Environment Day message by the Executive Director and other articles were carried by many newspapers and radio stations. Activities relating to World Environment Day 46/ took place in 80 countries in 1976.

600. Evaluation showed the extent of interest in the subject of water aroused by the World Environment Day material, but in view of the recommendations in the experts' report, there will be no single theme for 1977. Instead, countries will be encouraged to pick subjects of local concern, thus helping to foster local initiative.

42/ FP/0303-76-03/Global/IIED/844,500/570,000/1'77-X11'79/GC/61 and 96.

43/ FP/0303-75-01/Global/Internal/814,650/814,650/1'75-111'77/GC/61 and 96.

44/ FP/0303-73-04/North America/UNA-USA/1,012,850/260,850/1'74-X11'77/GC/61 and 96.

45/ FP/0303-77-01/Global/Internal/261,670/261,670/1'77-X11'78/GC/96.

46/ FP/0303-75-01/Global/Internal/814,650/814,650/1'75-111'77/GC/61 and 96.

601. Activity E - Wherever possible, an information component is incorporated in UNEP-supported activities. Current or recently completed examples are:

(a) Plans for the Conference on Desertification contain an important provision for information for the media, non-governmental organizations and others (see documents UNEP/GC/95 and UNEP/GC/95/Add.1);

(b) The Mediterranean programme has an on-going information component to give regular media coverage on progress and produces some supporting audio-visual material (paragraphs 493-504);

(c) The environmental education project, being carried out in co-operation with UNESCO, has its own information component which includes provision for the production of "CONNECT" newsletter (paragraphs 563-565);

(d) Three training films dealing with the work environment in different situations have been provided as part of a joint UNEP/ILO activity (paragraph 568 (c) (i));

(e) Information components have resulted in the publication of:

(i) "Resource Materials for Environmental Management and Education" - MIT (paragraph 568 (f) (ii));

(ii) "An Environmental and Economic Study of the Consequences of Pesticide Use in Central America Cotton Production" - ICAITI (paragraph 248).

602. Many activities carried out in co-operation with UNEP have led to the production of reports of projects, meetings etc. Even though an information component may not have been included at the outset, it is clearly important, and in line with the Governing Council's expressed concern, that the "constituents" of UNEP, as well as those of the co-operating agencies involved, be aware of the existence of such reports and of how to obtain them. The Environment Co-ordination Board focal points discussed this matter at their meeting in September 1976 and agreed on the need to ensure the best possible distribution of the results of projects and to assist UNEP in providing as full information as necessary for inclusion in Report to Governments and the new UNEP/GC/FUND PROJECT/- series.

603. The Executive Director intends to continue the policy of incorporating an information component in Fund-assisted projects wherever possible, and accordingly proposes that an information component be included, wherever appropriate, in Fund programme activities. The following current or proposed examples, are taken from a far longer list:

Global Environmental Monitoring System programme activity centre: Includes provision for information activities during the period 1977-1979 (paragraphs 35-56).

Meeting of experts on ozone: An information component provides for preparing advance material for the media and special arrangements for media coverage at the Washington meeting (paragraph 140).

Human settlements: Dissemination of information on the demonstration actions in Indonesia and the Philippines, and regional activities for an integrated approach for improving slums and marginal settlements, giving priority to Asia (paragraph 189).

Arid lands: In order to create public awareness and ensure the maximum public co-operation, an information component has been included in the integrated pilot project to promote rehabilitation and better management of arid lands (paragraph 267).

"Trees" programme: An information component will be included with the object of creating a greater awareness of the importance of trees among members of the public (paragraph 290).

Ecodevelopment: Studies and backstopping services for eco-development, including production of a newsletter (see paragraph 406).

3. Proposed Fund programme activities

604. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) The programme of regular publications, including the UNEP journal, books and suitable project reports (paragraphs 587-592);
- (b) The production of information materials on environmental matters suitable for use by different media (paragraphs 595-596);
- (c) World Environment Day activities (paragraph 600);
- (d) Continued incorporation of information components in Fund-supported activities (paragraph 603).

4. Major policy issues for the attention of the Governing Council

605. The Governing Council may wish to focus its policy discussion of this section principally on the following issues:

- (a) Steps taken to improve communication with Governments (paragraphs 588 and 602);
- (b) The steps taken to extend UNEP's publishing capacity (paragraphs 587-592);
- (c) The reorientation of World Environment Day activities (paragraphs 597-600).

D. TECHNICAL ASSISTANCE

1. Objectives, strategies and concentration areas

606. The objectives and strategies for technical assistance were approved by the Governing Council at its third session; 47/ they have been summarized elsewhere. 48/

607. At its fourth session, the Governing Council agreed 49/ that the following two elements should be concentration areas:

- (a) Development of a technical assistance clearing house facility;
- (b) Conduct of traditional technical assistance functions requested by Governments.

608. Also at its fourth session, the Council took a decision on training and technical assistance, to which reference has already been made (paragraph 573). In the same decision the Governing Council noted the criteria set by the Executive Director for the provision of technical assistance. 50/

2. Activities

609. The activities are:

Activities within the concentration areas

Activity A - Continued development of clearing house facility (paragraph 610).

Activity B - Support for and strengthening of the regional advisory teams (paragraph 611).

47/ Decision 29 (III), para. 1.

48/ UNEP/GC/INFORMATION/1, sect. IV. C. 1 (a) and (b).

49/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

50/ Decision 68 (IV), para. 2; UNEP/GC/31/Corr.3 and UNEP/GC/81.

Activity C - Development of technical assistance capacity in relation to general environmental policy, including assistance on administrative and legal matters (paragraphs 612-613).

Activity D - Incorporation of technical assistance components in UNEP-supported projects (paragraphs 614-616).

Other activities

Activity E (1977) - Completion of the study of problems and matters related to the environment on which Governments of developing countries would be interested in receiving training and technical assistance (paragraph 617).

Activity F - Further development of study tour programmes (paragraph 618).

Activity G - Continued development of UNEP's capacity to ensure that environmental factors are fully reflected in the technical assistance provided by the United Nations system as a whole (paragraph 619).

(a) Activities within the concentration areas

610. Activity A - The clearing house facility is now at the first stage of actual operations and the secretariat has developed internal procedures to match requests with offers of technical assistance. A total of fifty countries were involved in these arrangements on 31 January 1977. In addition, seven countries have either reconfirmed requests or announced their intention to submit new ones. Among the requests the clearing house is currently processing are four concerning assistance in the field of sanitation and marine pollution submitted by three countries. Three requests for technical information have also been confirmed, and have been referred to information sources (including IRS) as appropriate. In matching requests and offers, UNEP attempts to satisfy requirements of both recipient and donor countries, avoiding duplication of existing procedures and channels and at the same time bringing a valuable appraisal of the potential impact of the proposed operation. It is expected that initial experience will enable the secretariat to improve upon and refine its procedures. The operational procedures for the clearing house have only recently become effective, and it is thus too early to evaluate the arrangements adequately. Moreover, the clearing house facility was launched at a time of uncertainty among requesting countries regarding the financing of technical assistance as a result of the financial stringencies of UNDP. In any case, the effective development of the facility depends on the response of donors to specific technical assistance requests now being processed.

611. Activity B - Regional advisory teams have been established for Africa, Latin America, Asia and the Pacific and West Asia as an important component of the UNEP regional offices. ^{51/} They are located in Nairobi, Mexico City, Bangkok and temporarily Bahrain. The teams give preliminary advice in certain priority fields where they have technical competence, and have begun to co-ordinate their activities with those of the existing United Nations Development Advisory Teams. Where the advisory teams are unable themselves to provide the advice required, their advisory capacity is supplemented by short term consultancies.

612. Activity C - A recurrent theme in technical assistance requests is for high-level policy advice on environmental matters, including general overviews of environmental problems and rather more specific advice on environmental machinery and legislation. A joint UNEP/ECA study of environmental machineries in Africa is under way, ^{52/} and a number of current or planned activities, for example under environmental law (paragraph 631), are also relevant to such requests.

^{51/} FP/0302-75-12/Global/Internal/2,693,404/VII'75-XII'75/GC/96.

^{52/} FP/0302-75-13/Africa/ECA/120,500/II'75-III'77/GC/96.

613. UNEP intends to retain a particular capacity to provide overview advice on request, but in relation to other areas, the capabilities of the United Nations system will be used to the full. The joint programming meeting between UNEP and the United Nations Department of Economic and Social Affairs (October 1976) ^{53/} accordingly considered how the Department's Division of Public Administration and Finance might provide advice in response to many of the requests relating to administrative and legal matters which are referred to UNEP. The details of such an arrangement will be worked out between the two organizations during the first part of 1977. Similar arrangements may also be developed with other United Nations agencies whose areas of technical competence are especially relevant to matters which are the subject of requests for assistance, and already exist with IUCN in respect of conservation of wildlife and national parks.

614. Activity D - Technical assistance has been provided to Governments of developing countries ^{54/} to enable them to participate in some major global and regional projects, and to make full use of their results. Technical assistance is provided, wherever appropriate, as an integral part of a UNEP-assisted project, as are information and training. Examples of current activities which include a technical assistance component are as follows:

- (a) Pilot project on tropical forest cover monitoring (paragraph 37);
- (b) Pilot project on baseline studies and monitoring of oil and petroleum hydrocarbon in marine waters in the Mediterranean (paragraph 35);
- (c) Joint FAO/UNEP co-ordinated project on monitoring the levels and effects of selected pollutants in the Mediterranean marine organisms and ecosystems (paragraph 44);
- (d) Operation and development of IRS (paragraphs 75-76);
- (e) FAO catalogue of current legislation on environment and natural resources (paragraph 89);
- (f) Control of environmental contaminants in food in East Africa (paragraph 217);
- (g) Co-ordinating unit for desert encroachment control in the Sudan (paragraph 267).

615. It is intended to continue this practice, and technical assistance components will therefore be included - for instance - within the following proposed activities:

- (a) Those involving GARP (paragraphs 53-54);
- (b) Regional environmental programme for the Red Sea and the Gulf of Aden (paragraph 513).

616. In addition, many of the field activities undertaken or planned as part of the environment programme have a technical assistance value to the country concerned. An on-going example is the Sri Lanka rural energy centre ^{55/} (paragraph 535), and planned ones are in the areas of tropical woodlands (paragraphs 281-286), water (paragraphs 335-340) and ecodevelopment (paragraph 408 (a)).

^{53/} See document UNEP/GC/89, annex I, para. 14.

^{54/} FP/0302-75-03/National/Israel/150,000/75,000/XI'74-XI'77/GC/96; FP/0302-76-01/Kuwait/Internal/3,680/IV'76-V'76/GC/96; FP/0302-76-02/Zaire/Internal/7,380/IV'76-V'76/GC/96; FP/0302-76-03/National/Kenya/250,000/200,000/V'76-IV'77/GC/96; FP/1102-75-05/Global/FAO/1,087,850/586,850/IX'75-III'78/GC/96; FP/1302-74-03/Global/Internal/1,834,000/VI'75-XII'77/GC/90 and GC/96; FP/1302-75-02/Global/FAO/75,048/26,304/I'76-II'77/GC/96; FP/0503-76-03/Regional/IOC(UNESCO)/WMO/323,100/216,000/VII'76-XII'78/GC/96; FP/0503-76-06/Regional/IMCO/634,300/537,500/IX'76-XII'78/GC/96; FP/0107-75-02/Regional/FAO/1,501,230/881,450/V'76-XII'78/GC/96; FP/1101-76-04/National/Sudan/101,380/87,350/VI'76-X'76/GC/96; FP/0503-75-07/Regional/FAO/1,405,565/1,244,000/X'75-XII'77/GC/96.

^{55/} FP/0302-76-04/National/Sri Lanka/233,500/191,000/XI'76-XI'78/GC/96.

(b) Other activities

617. Activity E - The Council will receive information on the interests shown by developing country Governments in technical assistance in matters relating to the environment in an addendum to this report.

618. Activity F - So far three study tours 56/ have been undertaken with assistance from UNEP, all to China, to study methods of schistosomiasis control (1975), sand dune stabilization (1975) and energy and the environment (1976). In addition, UNHHSF, in association with the Asian regional office of UNEP, organized a study tour to a number of Asian countries to examine human settlements problems and solutions. The relevance of these study tours to appropriate programme activities is remarked upon elsewhere. In future, the Executive Director will give consideration to expanding the programme of study tours, to include study tours from developing to developed countries and vice versa, between developing countries, visits to pilot projects carried out by co-operating agencies and supporting organizations with UNEP participation.

619. Activity G - The principal activity is UNEP's examination of UNDP draft country programmes. Following discussions with UNDP during October 1975, resident representatives of UNDP, who also represent UNEP in their countries, have sent draft country programmes to UNEP for comment. In examining these, UNEP has looked for proposed activities which might, with suitable adjustment, be brought within the scope of the environment programme, and more generally has sought to ensure that environmental factors are properly reflected in the country programme (though manpower constraints have meant that it has been necessary to be selective in examining these documents).

3. Proposed Fund programme activities

620. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) The operation of the clearing house (paragraph 610);
- (b) Continued support of the regional advisory teams (paragraph 611);
- (c) Development of assistance for general environmental policy, administrative and legal matters (paragraph 613);
- (d) Technical assistance components in Fund programme activities (paragraph 616);
- (e) Further study tours (paragraph 618).

4. Major policy issues for the attention of the Governing Council

621. The Governing Council may wish to focus its policy discussion of this section principally on the following issues:

- (a) The provision of technical assistance through Fund programme activities to enable Governments to take part in activities of major global and regional importance (paragraph 614);
- (b) The provision of technical assistance on general environmental policy, administration and legislation (paragraph 613), other requests for assistance in technical fields being met through the regional advisory teams or short consultancies (paragraph 611) and the clearing house facility (paragraph 610).

56/ FP/0302-75-04/Global/Internal/165,982.20/11'75-X11'75/GC/96; FP/0700-76-01/Global/Internal/52,000/VIII'76-XI'76/GC/96.

Chapter V

ENVIRONMENTAL MANAGEMENT INCLUDING ENVIRONMENTAL LAW

622. The functional task of environmental management, including environmental law, is expected to develop approaches and techniques for achieving the goals of activities in the programme discussed in previous chapters. Whereas previously environmental law has been reported on as a separate functional task, the opportunity has been taken to bring it under the heading of environmental management. Legal measures are, of course, part of the management process, as was clearly recognized in the report of the Stockholm Conference. 1/ However, the distinctive nature of activities relating to environmental law requires that it be a separate section in this chapter; the other developments in environmental management are reported on thereafter.

A. ENVIRONMENTAL LAW

1. Objectives, strategies and concentration areas

623. At its third session, the Governing Council approved the objectives and strategies for environmental law; 2/ these have been summarized elsewhere. 3/

624. At its fourth session, the Council agreed that the following should be concentration areas:

(a) Implementation of Governing Council decisions for the initiation of activities to promote co-operation in the field of the environment concerning natural resources shared by two or more States;

(b) Development of a programme of activities in relation to environmental law at the national level. 4/

625. Also at its fourth session, the Governing Council requested the Executive Director 5/ to undertake the following activities:

(a) Systematic collection, analysis and presentation of data and information relating to activities and international conventions and agreements in the field of the environment;

(b) Development of the relevant principles contained in the Declaration of the United Nations Conference on the Human Environment, particularly the development through studies by governmental and other experts on the specific aspects of the problem relating to liability and compensation for pollution and other environmental damage;

(c) Promotion of international agreements or conventions to deal with global and regional concerns as well as with specific environmental problems in given geographical contexts, and efforts to encourage international forums and organizations to take the environmental law aspect into account in their work;

(d) Provision of technical assistance and guidelines to countries, at their request, for the development of their legislation for the purposes of environmental planning and control;

(e) Encouragement of universities and other research institutions to include, in their curricula and work, studies of the principles and practice of environmental law.

1/ Report of the United Nations Conference on the Human Environment; United Nations publication, sales No.: E.73.II.A.14, chap. II: recommendations 32, 37, 38, 47, 98 and 99, among others.

2/ Decision 29 (III), para. 1.

3/ UNEP/GC/INFORMATION/1, sect. V. A. 1 (a) and (b).

4/ UNEP/GC/57, para. 4, and decision 47 (IV), sect. I, para. 3.

5/ Decision 66 (IV).

2. Activities

626. The activities are:

Activities within the concentration areas

Activity A (1977) - Implementation of Governing Council decisions for the initiation of actions to promote co-operation in the field of the environment concerning natural resources shared by two or more States (paragraph 627).

Activity B - Development of a programme of action in relation to environmental law at the national level (paragraphs 628-631).

Other activities

Activity C - Development of principles of international environmental law (paragraphs 632-640).

Activity D - Encouragement of universities and other research institutions to include, in their curricula and work, studies of the principles and practice of environmental law (paragraphs 641-644).

(a) Activities within the concentration areas

627. Activity A - The Governing Council, at its third session 6/ took note of General Assembly resolution 3129 (XXVIII) of 13 December 1973. In compliance with that resolution, the Council requested the Executive Director to convene an intergovernmental working group of experts to formulate principles and guidelines which would promote harmonious utilization and conservation of natural resources shared by two or more States. 7/ The working group of experts held its first session in Nairobi from 12 to 22 January 1976, and submitted an interim report. At its fourth session, the Governing Council took note of the report and authorized the Executive Director to reconvene the group to continue its work. 8/ A second session was held in Geneva in 1976 from 22 to 30 September, and a third session in Nairobi from 10 to 21 January 1977 to complete the task and approve a report for submission to the Governing Council. 9/

628. Activity B - Two actions are involved:

(a) Building up and maintaining files for all States Members of the United Nations on national environmental legislation;

(b) Provision of legal guidelines for legislators and administrators, particularly those in the developing countries, to strengthen environmental protection.

629. The main purpose of the country files will be to help ascertain the extent to which States which are parties to international conventions have taken corresponding national legislative measures. This knowledge will enable the Executive Director to identify and help Governments which encounter difficulties in meeting their obligations.

6/ Decision 44 (III).

7/ FP/1400-75-02/Global/Internal/240,800/240,800/X'75-1'77/GC/96.

8/ Decision 77 (IV).

9/ See UNEP/GC/101.

630. To provide an input to the files, Governments will be requested to provide the UNEP secretariat with copies of existing and planned legislation, initially on pollution of air, water (including marine waters) and soil, and on conservation of fauna, flora and energy. Arrangements will be made with organizations and libraries which hold copies of national environmental legislation so that UNEP can be supplied regularly with information. The country files will be compiled in collaboration with IUCN and other institutions, and will be expanded and updated periodically.

631. The provision of legal guidelines for legislators and administrators in developing countries will assist countries to develop their own legislation, accept obligations under international agreements and create national environmental machinery and other institutions needed to give effect to such legislation. As a first step, surveys of selected countries will be undertaken to identify national needs in the field of environmental legislation. These surveys will be followed by regional seminars on environmental management in order to expose governmental lawyers and personnel to the nature of environmental problems, to identify specific requirements for action, to exchange relevant information, and to develop model legislation; thus enabling participants to know when to ask for technical assistance in this field, and to make the best use of it (paragraphs 612-613). Surveys and seminars will be held in the Caribbean and Asia in 1977 and in Latin America and Africa in 1978. They will take account of existing and planned activities of United Nations bodies, specialized agencies and other international organizations, and will be conducted in collaboration with them.

(b) Other activities

632. Activity C - The following actions are involved:

- (a) Periodic surveys and updating of the status of international conventions and agreements on a continuing basis;
- (b) Systematic evaluation of existing treaties on a continuing basis;
- (c) Establishment of a register of international environmental law;
- (d) Promotion and development of new international conventions;
- (e) Development of new principles in international law in the field of the environment.

633. At present UNEP periodically surveys and updates the status of treaties concerning the environment and urges Governments to sign or accede to specific treaties. Henceforth, depositaries will be asked to supply UNEP with the required information without waiting for a specific request. All Governments will similarly be asked to notify the Executive Director of their intentions to become parties to such conventions.

634. Governments which are urged to ratify or accede to environmental treaties, as requested by the General Assembly and the Governing Council, ^{10/} require prompt access to the contents of at least the major treaties so as to identify those which concern them closely. The actions described in the next two paragraphs are relevant to this need.

635. In accordance with the Governing Council request at its third and fourth sessions, the Executive Director presents a report on the status of international conventions and agreements to the Governing Council. ^{11/} In accordance with General Assembly resolution 3436 (XXX), this report is subsequently submitted to the General Assembly.

636. UNEP's purposes in this area are served by the activities of several United Nations agencies and international organizations such as FAO, IAEA and IUCN, which systematically collect and compile treaties and conventions concerning the environment. But since most of these bodies collect and analyse data on international conventions only within their own fields of competence, it is intended to establish a comprehensive and broadly-based register of international environmental conventions and agreements. This register will be prepared in co-operation with other agencies and made widely available. An indication of the current status of such conventions, which will form the nucleus of the register, is before the Governing Council as UNEP/GC/INFORMATION/5.

^{10/} General Assembly resolution 3436 (XXX); Governing Council decision 67 (IV).

^{11/} In 1976 this report was issued as document UNEP/GC/61/Add.2, this year as UNEP/GC/91.

637. New international agreements are needed on specific types of environmental problems, such as regional seas, ecosystems conservation and possibly weather modification. A survey was conducted in 1975, at the request of the General Assembly, ^{12/} of legal aspects to which organizations in the United Nations system had given attention, and which might help develop new international environmental principles and conventions. On the basis of the facts revealed by this survey, UNEP will collaborate with United Nations agencies as follows:

(a) With WMO, UNEP will assemble scientific information to ascertain the environmental impact of weather modification. Due consideration will also be given to the question of using weather modification for military purposes or any other hostile activity (paragraphs 137-138);

(b) With IUCN, FAO and other organizations, UNEP will review the status and effectiveness of legislation for the protection of wildlife and habitats (paragraph 391) and for the conservation of living marine resources (paragraphs 486-487);

(c) UNEP is exploring the possibility with United Nations bodies and specialized agencies of preparing legal instruments to control pollution in several marine regions (paragraphs 505 and 509).

638. The elaboration of new legal principles for dealing with environmental problems is a necessary part of the development of international law. Several United Nations and other bodies and agencies, such as FAO, WHO, UNITAR, ECLA, the International Law Commission and OECD are already engaged in work of this kind; UNEP keeps in close touch with these bodies and takes their activities into account when planning new initiatives.

639. UNEP has carried out two actions in this area:

(a) The development of principles and guidelines in relation to shared natural resources (see paragraph 627);

(b) A study of the problems of liability and compensation for pollution and environmental damage, undertaken at the request of the Governing Council. ^{13/} A small group of experts met between 7 and 10 December 1976 to help prepare documents for a meeting of governmental and other experts between 23 February and 4 March 1977. The results of this meeting will be reported in an addendum to the present report.

640. UNEP has also followed closely the progress made by the United Nations Conference on the Law of the Sea; as soon as the on-going negotiations reach definitive conclusions, the relevant principles which concern the environment will be developed with the co-operation of the appropriate United Nations agencies and international bodies (paragraph 472).

641. Activity D - Some developed countries have introduced environmental studies into university courses, including those of law faculties. Consequently, these countries are able to produce a cadre of lawyers and policy-makers conversant with environmental problems, particularly those which concern their regions.

642. The same cannot yet be said of other developed countries and most of the developing ones. To assist and encourage them to produce such a body of environmentalists, the following actions have been planned:

(a) The establishment of a programme activity centre for environmental education and training on an experimental basis;

(b) The establishment of a network of universities and other institutions to train lawyers and policy-makers capable of formulating environmental policies, legislation and regulations.

^{12/} Resolution 3326 (XXIX), para. 4 (f); see UNEP/GC/61, annex II.

^{13/} Decision 66 (IV), para. (b). FP/1400-76-01/Global/Internal/138,500/138,500/X'76-IV'77/GC/96.

643. The programme activity centre is described elsewhere (paragraph 566). Its functions could extend to training and education in legal matters so that environmental factors are taken into account in designing curricula.

644. Regarding the second action, UNEP (and probably UNESCO, under their joint activity in environmental education) will, in 1977 and 1978, identify in various regions those universities which have the capacity to introduce environmental law into the curricula of their legal studies or as a supporting study in other disciplines. By 1979, this survey will provide a basis for preparing advice on suitable materials for teaching international and national environmental law in universities and other institutions.

3. Proposed Fund programme activities

645. The Executive Director intends to support the following actions from the Fund of UNEP:

- (a) Required activities, if any, in the work on shared natural resources (paragraph 627);
- (b) Compilation of country files on national environmental legislation in collaboration with IUCN (paragraph 630);
- (c) Regional surveys and seminars (paragraph 631);
- (d) Register of international environmental conventions and agreements (paragraph 636);
- (e) Activities required for the study of liability and compensation (paragraph 639 (b)).

4. Major policy issues for the attention of the Governing Council

646. The Governing Council may wish to focus its policy discussions of this section principally on the following issues:

- (a) The report on the study on liability and compensation for environmental damage (paragraph 639 (b));
- (b) The proposed plans for the introduction of environmental law into universities and research institutions, especially in developing countries, for the period 1977 to 1979 (paragraph 644).

B. ENVIRONMENTAL MANAGEMENT

1. Introduction

647. Environmental management has been defined in many ways, but common to all definitions is the requirement that environmental considerations be given due recognition in decision-making. ^{14/} Thus, the function of environmental management is to introduce the environmental dimension into the consideration of economic, social, political and other issues which have traditionally governed man's activities. It is not a separate discipline, nor is it the management of the environment *per se*; rather, it is the process by which, through management of human activities bearing on the environment, environmentally rational decisions are made and implemented.

648. The process of environmental management broadens and extends traditional decision-making through the inclusion of the additional dimensions of environmental quality and long-term sustained yield from the biosphere by proper management of natural resources for the benefit of present and future generations. It thus occupies an important place in the quest for alternative patterns of development and satisfaction of basic human needs.

^{14/} For the evolution of the concept of environmental management, see documents UNEP/GC/31 (paras. 162-174) and UNEP/GC/61 (paras. 316-319), as well as Governing Council decisions 8 (II), 29 (III), particularly paragraph 4, 47 (IV), particularly sect. IV, para. 5, and 50 (IV). See also the report of the UNEP/IIASA expert meeting on environmental management, UNEP/GC/(III)/Inf.3.

649. In developing and refining the concepts and practice of environmental management, UNEP will draw particularly on the results of activities undertaken under environmental assessment and the priority subject areas discussed in previous chapters.

2. Objectives, strategies and concentration areas

650. At its third session the Governing Council endorsed the objectives and strategies for environmental management; ^{15/} these have been summarized elsewhere. ^{16/} At its fourth session it amended the strategy in order to include an element on environmental statistics. ^{17/} Also at its fourth session the Governing Council endorsed the proposal of the Executive Director that the development and refining of the concept of environmental management, and the establishment of a number of related pilot activities, should be regarded as a concentration area. ^{18/}

3. Activities

651. The activities are:

Activities within the concentration areas

Activity A - The preparation and dissemination of materials on environmental management so as to alert Governments to the need for environmental management and demonstrate how it can be applied (paragraphs 652-654).

Activity B (1977-1978) - Exploration of the possible uses and application of systems analysis and modelling in environmental management (paragraphs 655-657).

Activity C - Development of guidelines for the design and implementation of environmentally sound development projects (paragraph 658).

Activity D - Initiation and launching at the regional and subregional levels of integrated environmental management programmes for the benefit of the area concerned and for demonstration, catalytic and learning purposes (paragraphs 659-660).

Other activities

Activity E - Incorporation of the lessons learned through programme activities into the concepts and practice of environmental management (paragraphs 661-663).

(a) Activities within the concentration area

652. Activity A - Action began in 1976 as a part of a longer term effort to further understanding of the theory and practice of environmental management. A volume on principles and approaches to environmental management is now being prepared, ^{19/} as a guide to Governments and others. The next stage will be the preparation and production of manuals, guidelines, technical bulletins and other materials describing various aspects of the environmental management process and the available tools. These materials will be tailored to the varying requirements of different countries and regions. Close co-operation is envisaged with the other parts of the United Nations system which are already producing very useful data and publications in their fields of competence; for example with ECE which is carrying out a study of environmental impact assessment as practised in Europe.

^{15/} Decision 29 (III), para. 1.

^{16/} UNEP/GC/INFORMATION/1, sect. V. B. 1 (a) and (b).

^{17/} Decision 50 (IV), para. 5 (e). The report on environmental statistics has now been moved to the chapter on environmental assessment (see chap. II. B).

^{18/} UNEP/GC/57, para. 4, and decision 47 (IV), sect. 1, para. 3.

^{19/} RA/1000-75-06/Global/TECNECO/109,000/90,000/11'76-VII'76/GC/68 and 96;
FP/1000-75-04/Global/Internal/89,500/111'75-VI'77/GC/68.

653. Illustrations and case studies of environmental management in practice will be prepared. These will focus on the problems encountered in achieving successful environmental management and the ways to overcome them, the role of institutions and technology, how to implement a cross-sectoral approach in decision-making as part of environmental management, and the effectiveness of the methods and techniques being used. Such studies are expected to provide lessons for inclusion in the manuals for decision-makers (paragraph 652), and provide the means and data for further refinement of environmental management methodologies.

654. Environmental management requires an information base at the national, regional and global levels. Some of the global and regional data will come from IRS, IRPTC and GEMS, some of the national data from the planned activities in the field of environmental statistics. To maximize the usefulness of this information, procedures are being developed for standardized collection and presentation of national environmental data. A detailed analysis of existing national environmental reports is being undertaken, with the aim of drafting guidelines for such reports; results should be available during 1977.

655. Activity B - Relevant work has been undertaken for a number of years within and outside the United Nations system; for example, UNESCO, FAO, WHO, WMO and ECE have been active in modelling aspects of the physical environment, while the Department of Economic and Social Affairs has been engaged in socio-economic modelling. UNEP is co-operating, for example, with IIASA on energy options, and on ecological and resilience indicators for management. UNEP has also sponsored a book on river water quality management models, based on several national case studies.

656. It is planned to hold a meeting of experts associated with the principal global modelling efforts to consider ways to ensure that environmental considerations are given adequate attention in such models; hitherto they have usually been overlooked or interpreted narrowly as pollution, pollution abatement and natural resources depletion. Interagency consultations will also be held on applications of modelling and systems analysis to environmental management.

657. Within this activity, UNEP also plans to take part in the execution of "Project 2000" (see paragraph 412).

658. Activity C - Some bilateral donors of development assistance and multilateral funding institutions have established guidelines for examining the environmental implications of development projects they might support. UNEP is co-operating in the preparation of a review of the extent to which environmental considerations are included within the development assistance goals of lending agencies and how this is reflected in practice (see paragraphs 411 and 661 (c)).

659. Activity D - The development of an integrated action plan for the sound environmental management of the Caribbean basin has been programmed in co-operation with ECLA; this plan will promote an integrated approach to protection and environmentally sound development in the Caribbean area. The special ecological, historical, geographic and cultural characteristics of the Caribbean are to be taken into account. Activities include collection of information on the state of the environment in the region and identification of environmental problems and gaps in knowledge, human and institutional resources available or needed to deal with the problems, and the machinery which might be needed for co-ordination and implementation of present and future action in the Caribbean. These activities will build upon work which has already been initiated by UNEP and other United Nations bodies. The action plan is to be submitted, probably within two years to an intergovernmental conference for approval.

660. A further regional activity is planned for the South Pacific (see also paragraph 514). Since this region has been relatively little affected by industrial activity and urban development, it offers an opportunity to promote environmentally sound forms of development from the outset, and is thus of special interest to UNEP. Because of this, and in view of the interest shown by Governments of the region in collaborating to achieve environmentally sound development, UNEP proposed to ESCAP the holding of a conference on the human environment of the South Pacific. This is expected to take place during 1978, as part of a series of special regional conferences to be organized by UNEP and ESCAP. A plan for environmental assessment and management in the region, using the resources of Governments, United Nations institutions and other organizations, will be submitted to the conference.

(b) Other activities

661. Activity E - Three actions are involved: 20/

(a) Studies of various types, such as research programmes and reviews of available knowledge, for example research on threats to the ozone layer (paragraphs 139-142), environmentally sound and appropriate technology (paragraphs 429-435), and the environmental consequences of energy production and use (paragraphs 531-533);

(b) Pilot and demonstration field projects, such as slum and marginal settlements (paragraph 189), pest management (paragraphs 241, 244 and 247), ecodevelopment (paragraph 408 (a)), UNEP/UNDP country missions on environment and development (paragraphs 402-403) and regional seas activities (paragraphs 493-515);

(c) Methodological studies and advice, such as the study by the University of Sussex Institute of Development Studies on methodologies for project analysis (paragraph 411).

662. A number of other important activities will also encourage the practice of environmental management, for example:

(a) The United Nations Conferences on Desertification and Water;

(b) The regional seminars on alternative patterns of development and life styles (paragraphs 400-401);

(c) The systematic examination, in the framework of the Environment Co-ordination Board, of its members' activities in order to establish any adverse environmental impacts of such activities and of the action taken or required to secure the minimization of such impact, 21/ and activities related to the new international economic order, including the review of the International Development Strategy for the Second United Nations Development Decade.

663. As the flow of environmental management advice from activities supported by UNEP and other sources increases, it becomes increasingly important that a strategy be developed to guide the environmental management activities in the environment programme. This will be done through the preparation of the Level One review on environmental management to be submitted to the Governing Council at its sixth session.

4. Proposed Fund programme activities

664. The Executive Director intends to support the following actions from the Fund of UNEP:

(a) Preparation and production of manuals, guidelines and other materials, and associated activities, including expert group meetings (paragraph 652);

(b) Case studies of environmental management (paragraph 653);

(c) Guidelines for national environmental reports (paragraph 654);

(d) Environmental modelling (meeting of experts) (paragraph 656);

(e) Integrated regional development action plans for the Caribbean (paragraph 659) and the South Pacific (paragraph 660).

20/ The actions listed are for illustrative purposes only and are not exhaustive.

21/ See UNEP/GC/89, para. 14 (g), and paras. 409-411 above.

5. Major policy issues for the attention of the Governing Council

665. The Governing Council may wish to focus its policy discussion of this section principally on the following issues:

- (a) The proposal for the further development of environmental management concepts, and their practical application (paragraphs 652-654);
- (b) The proposals for regional approaches to environmental management (paragraphs 659-660);
- (c) The proposal that a systematic effort be made to achieve a linkage between the outputs of the programme, i.e. research studies, field projects and methodology reviews, and the functional task of environmental management (paragraphs 661-663).

Annex I

GLOSSARY OF TERMS USED IN THE PROGRAMME DOCUMENT

Priority subject area: One of the six major divisions agreed by the Governing Council of the subject matter of the programme under which specific programme activities are grouped.

Functional task: One of the major divisions agreed by the Governing Council of the functions undertaken or promoted by the programme, under which specific programme activities are grouped.

Sub-area of priority subject area or functional task: A sub-division of a priority subject area or functional task.

Concentration area: A part of a priority subject area or functional task which has been approved by the Governing Council as requiring, at the time of approval, particular concentration of effort and resources.

Environmental assessment: The integrated process of assessing environmental conditions and trends through monitoring, information exchange, research, evaluation and review the results of which will serve as a basis for policy decisions; at the global scale this process is known as Earthwatch. Within Earthwatch, these terms mean:

- Monitoring: systematic observation, measurement and interpretation of environmental variables for defined purposes;
- Information exchange: the exchange of information brought to light in the assessment process;
- Research: the provision of new information or new interpretations of existing information with the aim of:
 - Improving monitoring or evaluation techniques, and
 - Improving the understanding of the mechanisms underlying environmental processes;
- Evaluation: validation of environmental data and information, and interpretation of the output data;.
- Review: determination of flaws in the Earthwatch process and identification of gaps and of the means of filling them.

Environmental management: The management, through goal setting, planning, legal means, etc., of human activities bearing on the environment so that sustained and environmentally rational decisions are made and implemented, thus enabling economic and social development to proceed for the benefit of present and future generations.

Supporting measures: Those programme activities (environmental education, environmental training, information and technical assistance) which contribute to the creation of conditions suitable for environmental assessment and environmental management.

Objectives: A generalized statement approved by the Governing Council of the broad aim towards which programme activities are to be directed in priority subject areas and functional tasks.

Strategy: A set of elements endorsed by the Governing Council, and describing in general terms the co-ordinated and integrated approach which it is intended to take to attain the objectives for a particular priority subject area or functional task.

Activity: Specified action or actions, leading to an achievable and closely-described target, which it is normally intended to attain within a specified period.

Level One: The review of each priority subject area or functional task identified by the Governing Council to display issues in relation to the activities being undertaken or planned to deal with them, and thus to help Governments to identify gaps in action, establish or revise objectives and priorities, and allocate responsibilities for action.

Level Two: The programme of action required to meet the objectives in the environmental field, thereby establishing an operational framework which points out the principal actions to be taken, identifies the principal "actors" involved, and provides a basis for the identification and elaboration of specific actions and projects.

Level Three: Those activities or parts of activities identified within the programme at Level Two which are selected for support by the Environment Fund.

Co-operating agency - The United Nations, a specialized agency or the International Atomic Energy Agency when co-operating in the Fund programme.

Supporting organization - Governmental and reputable non-profit-making intergovernmental or non-governmental organizations, usually of world or regional standing, when carrying out activities supported in co-operation with the Fund.

Internal project - A project supported by the Fund and contracted for execution to individual experts or firms, or to organizations which might not fulfil the criteria for consideration as supporting organizations.

Annex II

PROPOSED FUND ALLOCATIONS FOR THE BIENNIIUM 1978-1979^{a/} ^{*}/
(in US dollars)

CHAPTER AND SECTION	EQUIVALENT BUDGET LINE AND PARAGRAPH REFERENCE	1978	1979
		TOTAL	TOTAL
II A	13. EARTHWATCH ^{b/}	<u>4,100,000</u>	<u>4,860,000</u>
	1301 GEMS (para. 57)	2,762,000	3,520,000
	1302 IRS (para. 91)	923,000	907,000
	1303 Outer limits (paras. 117 and 151) ^{c/}	415,000	433,000
II B	16. ENVIRONMENTAL DATA ^{d/} (para. 167)	<u>710,000</u>	<u>660,000</u>
III A	01. HUMAN SETTLEMENTS AND HUMAN HEALTH	<u>5,810,000</u>	<u>5,850,000</u>
	0104 General development of human settlements (para. 197)	1,889,000	1,321,000
	0106 Human settlements technology (para. 197)	1,100,000	1,050,000
	0107 Human and environmental health (para. 229)	1,858,000	2,579,000
	0108 Pest management systems (para. 250)	963,000	900,000
III B	11. TERRESTRIAL ECOSYSTEMS	<u>7,620,000</u>	<u>7,400,000</u>
	1101 Arid and semi-arid lands ecosystems (para. 272)	2,600,000	2,065,000
	1102 Tropical woodlands and forests (para. 294)	907,000	1,196,000
	1105 Other ecosystems (para. 304)	300,000	300,000
	1106 Soils (para. 325)	1,156,000	1,100,000
	1107 Water (para. 350)	1,027,000	1,190,000
	1108 Genetic resources (para. 371)	1,030,000	949,000
	1103 Ecosystems, sites and samples ^{e/} (para. 392)	300,000	300,000
	1104 Endangered species ^{e/} (para. 392)	300,000	300,000
III C	04. ENVIRONMENT AND DEVELOPMENT	<u>1,600,000</u>	<u>1,200,000</u>
	0404 Integrated approach to environment and development including eco-development (para. 416)	600,000	600,000
	0407 Natural resources (para. 425)	100,000	-
	0402 Environmentally sound and appropriate technologies (para. 437)	300,000	100,000
	0408 Industry and environment (para. 458)	600,000	500,000

^{*}/_{For the foot-notes see next page.}

Annex II (cont.)

CHAPTER AND SECTION	EQUIVALENT BUDGET LINE AND PARAGRAPH REFERENCE	1978	1979
		TOTAL	TOTAL
III D	05. OCEANS ^{f/}	<u>4,000,000</u>	<u>3,190,000</u>
	0501 Marine pollution (para. 517 (a) (i))	200,000	-
	0502 Living marine resources (para. 517 (a) (ii))	870,000	950,000
	0503 Regional activities (para. 517 (b))	2,930,000	2,240,000
III E	07. ENERGY (para. 538)	<u>570,000</u>	<u>570,000</u>
III F	12. NATURAL DISASTERS (para. 557)	<u>550,000</u>	<u>500,000</u>
	03. SUPPORT	<u>4,800,000</u>	<u>4,730,000</u>
IV A, B	0301 Training and education ^{g/} (paras. 569 and 581)	1,900,000	1,900,000
IV C	0303 Information (para. 604)	1,350,000	1,330,000
IV D	0302 Technical assistance (para. 620)	1,550,000	1,500,000
V A	14. ENVIRONMENTAL LAW	<u>340,000</u>	<u>340,000</u>
V B	10. ENVIRONMENTAL MANAGEMENT (para. 664)	<u>800,000</u>	<u>700,000</u>
	15. UNITED NATIONS HABITAT AND HUMAN SETTLEMENTS FOUNDATION ^{h/}	<u>700,000</u>	-
	GRAND TOTAL	31,600,000	30,000,000
	FUND RESERVE	1,000,000	1,000,000

^{a/} The major budget lines will be found for approval in the draft decision in document UNEP/GC/98.

^{b/} Provision for IRPTC (para. 101) is contained in the Human and environmental health sub-line (0107).

^{c/} For budgetary purposes, the assessment of basic human needs is included within this sub-line.

^{d/} Subject to the Council's decision, this new budget line will be established to reflect the presentation of the programme in this document. It will include sub-line 0304 - Data-gathering for Level One.

^{e/} For an explanation of why these titles are not used in the text, see para. 253.

^{f/} Activities previously supported under sub-line 0504 (International agreements) will be covered under 0503 (Regional seas activities) or under 14 (Environmental law).

^{g/} Provision for both education and training is made in sub-line 0301.

^{h/} This allocation represents the balance of the US \$4 million allocated to the Foundation for the years 1975-1978 by Governing Council decision 16 A (II). See also document UNEP/GC/94.

Annex III

SUGGESTED ACTION BY THE GOVERNING COUNCIL

After considering documents UNEP/GC/90 and UNEP/GC/90/Add.1, the Governing Council may wish to take a decision on the following lines:

I

1. Notes (with approval) the efforts of the Executive Director to improve the presentation of the programme;
2. Notes with satisfaction the endeavours by various members of the United Nations system to develop new activities, or reorient existing ones, to ensure the implementation of the various strategies adopted by the Council, and urges the governing bodies of the relevant United Nations bodies and specialized agencies to authorize their executive heads to continue and further develop their fruitful co-operation with the Executive Director of UNEP in this respect;

II

1. Notes the summary of the Level One reviews for human settlements and habitat, health of people and of the environment, and natural disasters, and invites the Executive Director, in the further development of work plans in those areas, to take full account of their conclusions;
2. Notes with appreciation the response from Governments, United Nations organizations, other intergovernmental bodies and non-governmental organizations to requests for information on their activities relevant to the environment programme;
3. Reiterates its invitation to all Governments, United Nations organizations, other intergovernmental bodies and non-governmental organizations, in accordance with General Assembly resolution 2997 (XXVII) of 15 December 1972, to co-operate fully with the Executive Director in the preparation of the reviews by providing him with the information which he requests;

III

1. Approves the revised objectives and strategies for the International Referral System a/ and Human settlements and habitat, b/ and the proposed objectives and strategies for the assessment of basic human needs; c/
2. Approves the revised description of the concentration area within the integrated approach to environment and development including ecodevelopment; d/
3. Invites the Executive Director to keep the list of concentration areas under continuous review and to propose desirable deletions or additions to the Governing Council at its sixth session, bearing in mind:
 - (a) The desirability of reducing the list of concentration areas and defining them more narrowly and with greater precision;
 - (b) The importance of concentrating upon action-oriented activities which serve as examples or lead to guides for better environmental management;
 - (c) The need to adjust the list of concentration areas from time to time to respond to emerging issues and to ensure that certain topics are not neglected;

a/ UNEP/GC/90, para. 71.

b/ Ibid., para. 180.

c/ Ibid., para. 112.

d/ Ibid., para. 398 (b).

- (d) The lessons learnt from developing the programme;
 - (e) The importance of maintaining a list of concentration areas within the programme which responds to the priorities of concern to all Governments;
 - (f) The need to concentrate on those parts of the environment programme which are most relevant to the sustained satisfaction of basic human needs without impinging upon the outer limits;
4. Endorses the activities and associated actions which have been taken, or are proposed, as described under the functional tasks and priority subject areas, and in particular:

(a) In respect of environmental assessment:

- (i) Earthwatch: the explanation of the general concept of Earthwatch, especially the relationship between basic human needs and outer limits; e/ the response to Governing Council decision 63 (IV) concerning the Global Environmental Monitoring System; f/ encouragement for more active participation by Governments in the development and operation of the International Referral System; g/ the plans for a more coherent programme under outer limits in the areas of climatic change h/ and bioproductivity, i/ and the recommendations of the Executive Director for a programme of action on risks to the ozone layer; j/
- (ii) Environmental data: the intention to develop systems for environmental statistics and other forms of environmental data collection, k/ and the arrangements for data collection for the Level One exercise and for the state of the environment reports; l/

(b) In respect of priority subject areas:

- (i) Human settlements and human health: the plans to establish regional networks of institutions to develop, apply and exchange information about environmentally sound and appropriate human settlements technologies, m/ and to continue with some actions in the control of communicable and non-communicable diseases through environmental intervention and of occupational health hazards; n/
- (ii) Terrestrial ecosystems: the increased emphasis put on demonstration and field actions in the sub-areas of tropical woodlands and forests, soils and water (in relevant respects, action to be guided by the outcome of the United Nations Water Conference and the United Nations Conference on

e/ Ibid., paras. 11-19, especially 15 and 16.

f/ Ibid., paras. 28-34.

g/ Ibid., paras. 73-78.

h/ Ibid., paras. 125-134.

i/ Ibid., paras. 143-146.

j/ Ibid., para. 140.

k/ Ibid., paras. 160-164.

l/ Ibid., paras. 165-166.

m/ Ibid., para. 188.

n/ Ibid., paras. 222-227.

Desertification); o/ the plan of action on trees; p/ without prejudice to the outcome of the United Nations Conference on Desertification, the intention to concentrate effort in arid and semi-arid ecosystems around the programme of the Food and Agriculture Organization of the United Nations for the Ecological Management of Arid and Semi-Arid Rangelands, the Integrated Project on Arid Lands of the United Nations Educational, Scientific and Cultural Organization, and desert encroachment in a limited number of countries, and the actions in the field of firewood and substitutes; q/ the shift in emphasis from assessment to management actions in the area of soils and the increased importance given to rehabilitation of mined areas; r/ the intention to give greater attention to health aspects in respect of water; s/ the increasing importance given to microbiology in environmental management, and to developing co-ordinating mechanisms for work in genetic resources; t/ and the integration of all activities related to the conservation of ecosystems and their biotic resources, u/ and the current and planned action relating to legislation on wildlife and protected areas; v/

(iii) Environment and development: the planned seminars on alternative patterns of development and life styles; w/ steps to encourage international organizations to be more responsive to environmental considerations; x/ planned actions on the rational use of natural resources; y/ the proposal for a network of institutions involved in the development of environmentally sound and appropriate technologies; z/ and the proposals for future activities in the environmental problems of specific industries; aa/

(iv) Oceans: the increased prominence which it is proposed to give to better protection, management and utilization of living marine resources; bb/ the guidelines adopted for action plans for all marine regions, comprising assessment, management and supporting activities; cc/ the progress being made in each of the regional seas and the Executive Director's intention to establish a programme activity centre to guide future work in the area of regional seas; dd/

o/ Ibid., paras. 281-286, 318-319, 335-340 and 349.

p/ Ibid., paras. 288-290.

q/ Ibid., paras. 262-269 and 270 (a).

r/ Ibid., paras. 318-319 and 320-321.

s/ Ibid., paras. 335-338 and 340.

t/ Ibid., paras. 358-364, 365 and 368.

u/ Ibid., paras. 252 and 382.

v/ Ibid., paras. 389-391.

w/ Ibid., paras. 400-401.

x/ Ibid., paras. 409-415.

y/ Ibid., paras. 421-422.

z/ Ibid., paras. 429-435.

aa/ Ibid., paras. 445-454.

bb/ Ibid., paras. 475-487.

cc/ Ibid., para. 489.

dd/ Ibid., paras. 493-516.

- (v) Energy: the intention to update the review of the impact of energy on the environment through the findings of expert panels, and the developments in the experiments with rural energy centres; ee/
- (vi) Natural disasters: concentration on improvement of early warning systems and application of existing techniques for disaster prevention; ff/
- (c) In respect of supporting measures:
 - (i) Environmental education: concentration on the joint United Nations Educational, Scientific and Cultural Organization/United Nations Environment Programme environmental education programme, basing further activities in the field on the recommendations of the forthcoming International Conference on Environmental Education, gg/ and the establishment of regional programme activity centres in environmental education and training; hh/
 - (ii) Environmental training: the inclusion of training activities in various parts of the environment programme in order to meet the needs of the various countries, particularly developing ones; ii/
 - (iii) Information: the steps taken to improve communications with Governments, jj/ the steps taken to extend the publishing capacity of the United Nations Environment Programme, kk/ and the reorientation of World Environment Day activities; ll/
 - (iv) Technical assistance: the provision of technical assistance, mainly through projects supported by the United Nations Environment Programme, to enable Governments to take part in major global and regional activities, mm/ and the provision of technical assistance on general environmental policies, administration and legislation, other requests for assistance being met through the regional advisory teams, short consultancies, the clearing house facility or the appropriate United Nations agency from support under the country programme of the United Nations Development Programme; nn/

ee/ Ibid., paras. 531-533.

ff/ Ibid., paras. 552 and 555.

gg/ Ibid., paras. 563-565.

hh/ Ibid., paras. 566-567.

ii/ Ibid., paras. 575-580.

jj/ Ibid., paras. 588 and 602.

kk/ Ibid., paras. 587-592.

ll/ Ibid., paras. 597-600.

mm/ Ibid., para. 614.

nn/ Ibid., paras. 610, 611 and 613.

(d) In respect of environmental management, including environmental law:

- (i) Environmental law: the report on the study of liability and compensation for environmental damage, oo/ and the proposed plans to introduce environmental law into universities and research institutions, especially in developing countries; pp/
- (ii) Environmental management: the proposals for the further development of environmental management concepts and their practical application; qq/ the proposals for regional approaches to environmental management; rr/ and the steps to improve the theory and practice of environmental management by research studies, field projects and methodological reviews. ss/

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oo/ Ibid., para. 639 (b).

pp/ Ibid., para. 644.

qq/ Ibid., paras. 652-654.

rr/ Ibid., paras. 659-660.

ss/ Ibid., paras. 661-663.