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Council of the Programme
on Man and the Biosphere (MAB)

Eleventh Session

Final Report

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1. INTRODUCTION

1.1 Convening of the session

In accordance with Resolutions 24 C/10.3 and 25 C/2.3 adopted by the General Conference of UNESCO at its twenty-fourth and twenty-fifth sessions, the eleventh session of the International Co-ordinating Council (ICC) for the Programme on Man and the Biosphere (MAB) was held at UNESCO Headquarters in Paris from 12 to 16 November 1990.

Participants included representatives of the following members of the Council elected by the General Conference: Antigua and Barbuda, Brazil, Canada, China, Colombia, Denmark, Ethiopia, France, Germany, Hungary, Italy, Japan, Jordan, Korea (Democratic People's Republic of), Malaysia, Malta, Mexico, Nigeria, Oman, Portugal, Togo, Union of Soviet Socialist Republics, Venezuela, Zaire, Zimbabwe.

In addition, observers from the following Member States were present: Argentina, Australia, Austria, Byelorussian Soviet Socialist Republic, Chad, Chile, Costa Rica, Cuba, Czechoslovakia, Egypt, Gabon, Greece, Guinea, Indonesia, Kenya, Madagascar, Mongolia, Netherlands, Pakistan, Panama, Peru, Poland, Rwanda, Spain, Sweden, Thailand, Tunisia, Ukrainian Soviet Socialist Republic. Representatives of the MAB National Committees of the United Kingdom and the United States of America were also present.

The United Nations Environment Programme (UNEP), the Food and Agriculture Organization of the United Nations (FAO), the International Council of Scientific Unions (ICSU), the International Union of Biological Sciences (IUBS), the Scientific Committee on

Problems of the Environment (SCOPE), the International Social Science Council (ISSC), the World Conservation Union (IUCN), and the Temenos Foundation were also represented. The full list of participants is given in Annex I.

1.2 Opening of the session

The session was opened by Mr Federico Mayor, Director-General of UNESCO. In welcoming delegates, the Director-General underlined the special importance of this session, which was taking place eighteen months before the United Nations Conference on Environment and Development (UNCED). He briefly reviewed the origins and development of MAB, the functions of the MAB Council and its Bureau, the results of the two programme-wide assessments on MAB carried out by UNESCO and ICSU in 1981 and 1986-1988, and the rationale for taking a fresh look at the accomplishments and shortcomings of MAB, as a springboard for planning future work.

The Director-General noted that it was now nearly two decades since the United Nations Conference on the Human Environment and the launching of programmes such as UNEP, SCOPE and MAB. Each of these, and indeed several other international initiatives, could be considered to have some real accomplishments to their credit in their respective fields of competence and activity. And yet the state of the environment in 1992 would surely be worse than in 1972. Thus the call for a fresh look and a new approach.

The Director-General referred to recent and planned activities serving to refocus attention on

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be discussed in respect to national participation in MAB. The agenda was as follows:

1. Opening of the session by the Director-General of UNESCO
2. Report of the Chairman of the outgoing Bureau
3. Election of the Chairman
4. Election of the Vice-Chairmen and Rapporteur
5. Adoption of the agenda
6. Adoption of the workplan for the Council and its Bureau
7. Report of the Secretary on activities since the last Council session
8. Presentation of a synthesis of reports submitted by MAB National Committees on their activities since the tenth session of the MAB ICC and activities planned for the future
9. Lessons from the past and projections for MAB's future
10. Review of and planning for MAB Research Networks contributing to sustainable resource use
11. Implementation of new foci for the biosphere reserves
12. Modern communication techniques at the service of MAB
13. Training and contributions to environmental education activities in MAB
14. Report to the Council on decisions and recommendations made by the Bureau which met during the eleventh session of the Council
15. The Sultan Qaboos Prize for environmental preservation
16. Collaboration with other international co-operative programmes
17. Other business
18. Adoption of the report
19. Closure of the session

The Council charged its Bureau with a number of tasks that needed to be undertaken during the week of the Council session, including examination of proposals for new biosphere reserves, pilot projects, MAB Young Scientists Research Grant Awards, etc. Members of the outgoing Bureau were invited to share their experience with the new Bureau in discharging these functions, with additional specialists being co-opted as desired to give counsel in particular fields (e.g. nominations for new biosphere reserves). The Bureau was also empowered by the Council to set up a small working party responsible for drafting recommendations and resolutions for subsequent consideration by the Council.

1.6 Report of the Secretary

Mr Bernd von Droste, Secretary of the Council, presented the report of the Secretariat for the period since the tenth session of the Council in November 1988, illustrating his remarks with maps and other graphic material (please see Annex II for an abridged version of this report). Among the issues addressed by Mr von Droste were a recapitulation of the main tasks of the eleventh session of the MAB Council, an overview of "MAB Today", budgetary and staff resources, and status of MAB National Committees and the international network of biosphere reserves. Mr von Droste briefly reviewed recent, ongoing and planned activities within thirteen international research networks, as well as in the fields of training and information materials. He concluded with some thoughts on future prospects for the development of MAB, including possibilities for reinforcing co-operation at the regional level (e.g. in Europe, in the humid tropics).

bottlenecks and obstacles to international action on environmental problems, including the launching of UNCED and the Second World Climate Conference. MAB could make a distinctive contribution to this process of questioning and re-assessment, particularly through identifying how obstacles to effective action on cross-sectoral environmental problems have been and can be surmounted.

In looking forward, the Director-General referred to two areas of prime importance to the future development of MAB and its contribution to the broad environmental agenda. A first priority is that of consolidating and reinforcing the international network of biosphere reserves. A great deal of dedicated and imaginative effort is required if the biosphere reserve concept is to achieve its potential. This said, the international network of biosphere reserves actually exists. It is the only international framework of protected natural areas at the inter-governmental level that seeks to harness conservation with development, research with demonstration, education with training, and so on.

A second priority is that of UNESCO mounting a major new initiative on the preparation and communication of information and educational materials on the environment. UNCED provided a wonderful opportunity and target date for preparing a range of imaginative and exciting materials on the environmental issues of the day. The Director-General indicated that it was in part with a view to mounting a major new initiative in this domain that he recently appointed Mr Francesco di Castri as Co-ordinator for the Environment. Mr di Castri's major task will be to lead an intersectoral task force on environmental education and information, with the charge of producing a range of multimedia information materials on the environment in the next eighteen months.

1.3 Report of the Chairman of the outgoing Bureau

Mr Li Wenhua, Chairman of the outgoing Bureau, presented to the Council an oral overview of the

two meetings of the Bureau held in Paris in April 1989 and in February 1990. The reports of these meetings had been circulated widely to MAB National Committees, and their substance had been reflected in working documents and information papers before the Council.

In his overview, Mr Li Wenhua stressed seven points: development of the biosphere reserve network, including additions to the network since the last session of the Council; launching of the MAB Young Scientists' Research Award Scheme; international pilot projects; new research orientations; contribution of extra-budgetary resources to MAB work, in particular in the humid tropics and arid zones; regional and interregional co-operation; and stock-taking and evaluation, including the Bureau's reaction to a draft resolution submitted to the last session of the UNESCO General Conference relating to the duration of UNESCO's environmental sciences programmes such as MAB.

1.4 Election of officers

The Council elected by acclamation the following officers to constitute its Bureau:

Chairperson:

Mrs Tania Maria TONELLI MUNHOZ
(Brazil)

Vice-chairmen:

Mr Saquib Bin Abdul-Husein
AL-MUSCATI (Oman)

Mr Yusho ARUGA (Japan)

Mr Wilfried GOERKE (Germany)

Mr Vladimir SOKOLOV (USSR)

Rapporteur:

Mr W.K. NDUKU (Zimbabwe)

1.5 Organization of the Council Session

The Council adopted its substantive agenda, it being understood that regional co-operation would

5. Several reports mentioned bilateral and regional co-operation but few referred to international co-operation.
6. National training, information, communication and educational activities relating to the environment and participation in regional and international meetings were noted in most of the reports. However, the recently established MAB Young Scientists Research Awards Scheme does not seem to be adequately linked to the MAB Research Plan.
7. As regards future prospects, proposals for national, regional and international meetings were contained in several reports; this activity appeared to be the most important role of MAB for some countries.

2. NATIONAL REPORTS

2.1 Analysis of national reports

Following circular letter No. 7/90 of 9 April 1990, the MAB International Secretariat had, by 30 September 1990, received 30 national reports which were analysed by Mr Gilbert Long, one of the Vice-chairmen of the outgoing Bureau. The analysis focused on the following main aspects:

- organization, operation and composition of National Committees;
- the international network of biosphere reserves;
- the MAB Research Plan;
- co-operative activities;
- other activities.

Despite its experimental character, the Council considered the analysis to be highly instructive and felt that it deserved to be supplemented by taking into account the additional reports transmitted to the Secretariat in October-November 1990, and other sources of information.

Several members of the Council stressed the need to make periodic evaluations of MAB to verify that it retains its dynamic and evolving character. Some members proposed that other methods of evaluating the programme, particularly field evaluations, should be used.

A number of countries apparently found it difficult to prepare satisfactory national reports within the allotted time, particularly because of the variety of scientific institutions that may be involved and due to the limited resources available to their National Committees.

2.2 Conclusions of the analysis

The main findings emerging from the 30 reports can be summarized as follows:

1. The reports did not always follow the proposed format, with the result that they did not always conform to MAB objectives.
2. The composition of National Committees varied considerably from one country to another and did not always facilitate the development of activities in keeping with the objectives and orientations of MAB.
3. The information on biosphere reserves in the reports was very uneven and did not faithfully reflect the actions carried out in the reserves or the measures taken to improve their operation. Some countries had, however, embarked on a process of reviewing their biosphere reserves in order to bring them more into line with the Action Plan for Biosphere Reserves. Furthermore, twinning arrangements and proposals for the establishment of trans-border reserves were being envisaged. Such initiatives deserved to be encouraged.
4. References to the MAB Research Plan were quite varied. Several countries continued to refer to the 14 initial MAB project areas, others to the foci decided on in the early 1980s, and few to the new orientations adopted in 1981. Some countries classified their research activities in relation to the biosphere reserves or to thematic or regional networks.

forcement of the international network of biosphere reserves as sites for addressing (through research, education, training, demonstration) the three priority topics of conservation of biological diversity, monitoring of global change and exploring environmentally sound approaches to sustainable development.

Biosphere reserves are admittedly only the most visible tip of the MAB iceberg, but the Council considered it important to draw international attention to that tip and to encourage actions that would help surface more of the iceberg. One such action welcomed by the Council was the proposal by the Spanish MAB National Committee to make available by early 1992 a sample programme from the 13-part series on the "Biosphere". This is being prepared by TV3-Televisió de Catalunya and Sono-Multivision, in co-operation with MAB National Committees and biosphere reserve administrations in all regions of the world.

Council members made a number of other specific suggestions on possible inputs from MAB to events leading up to UNCED. They included the preparation of booklets (addressing such questions as approaches to sustainable development, ecosystem monitoring, information-handling technologies), the focussing of attention on such key issues as desertification, integrated approaches to the training of specialists, reinforcing the capacity of developing countries to address issues at the environment-development interface, facilitating interaction and collaborative actions with other programmes (within and outside UNESCO).

3.2 Taking stock of MAB, looking forward

The Council recalled that one of its primary responsibilities is that of overseeing the progress and development of MAB, including the functions of stock-taking and evaluating the programme and its component parts. Two programme-wide evaluations have been undertaken so far (in 1981 and

1986-1988), both undertaken as joint efforts of UNESCO and the International Council of Scientific Unions. The general conclusion of the two exercises was that MAB had a fair number of accomplishments to its credit - not least in mobilizing in a range of settings and countries the scientific, political and public support necessary for mounting a certain approach to complex land use problems. At the same time, the two assessments drew attention to shortcomings and suggested re-orientations in approach and action, for example in giving greater attention to the economic driving forces affecting the environment and its resources and in increasing the scale of the research effort. The Council felt that some progress had been made in introducing these shifts in emphasis within MAB over the last few years, particularly through the vehicle of the four new research orientations within MAB approved by the MAB Council at its ninth session. This said, the Council felt that it had a responsibility to keep MAB constantly under review.

As an entry to the debate, Mr Jag Maini presented a personal overview of "MAB Today", today being a bridge between the past and the future. Mr Maini briefly reviewed past accomplishments and shortcomings, placing this review within the context of the increasing scale, scope and complexity of environmental issues over the last two decades, and the overall shift from pollution-related concerns to those of sustainable development. Past accomplishments of MAB included contributing to the evolution in research paradigms from ecosystems to biomes, and the elaboration of the "biosphere reserve concept" and its concrete manifestation in an international network of protected representative sites. Shortcomings included the relatively few measures to synthesize and communicate research results and the relatively low impact of research on policy.

In looking forward, Mr Maini presented some suggestions on future approaches and orientations, including changes in emphasis from studying to addressing issues and from scientific-elegance to policy-relevance criteria in project planning and assessment. Environmentally sustainable economic development was put

forward by Mr Maini as a possible over-arching theme for future MAB work. Ingredients in this work could include the early involvement of the policy community in the design of carefully structured comparative studies and the need to identify clearly the clients for the products of research.

Mr Maini's presentation and analysis were complemented by an examination by the Council of a working document outlining some issues that would seem important in any stock-taking cum forward planning exercise within MAB, specifically:

- Objectives and scope
- Guiding principles
- Thematic content
- Research instruments
- Duration
- Impact of research findings
- Effectiveness of the permanent structures of MAB
- Stock-taking, quality control and evaluation
- Funding
- International connections.

In the ensuing discussion, Council Members reiterated the importance of stock-taking and evaluation as an integral part of any collaborative research effort. Stock-taking and evaluation need to be built-in to each component part of the programme (e.g. the various research networks dealt with in Section 4 of this report), as well as for the programme as a whole. Steps should be taken to ensure syntheses of the substantive findings of MAB work in different domains, to provide the state-of-the-art scientific understanding as well as to provide policy relevant insights. Such syntheses should be prepared for all the principal research areas of MAB during the period 1991-1995.

In terms of a new programme-wide, stock-taking, an overview of two decades (1971-1990) of activities within MAB might be commissioned by UNESCO in consultation with the MAB

Bureau. Among other aims, such an overview would attempt to highlight the experience of MAB in putting into practice an interdisciplinary, cross-sectoral approach to complex land use problems. Among other uses, such an overview might be drawn upon by those involved in designing new research initiatives on the environment, both within and outside of MAB.

Reinforcing measures for the advanced scanning of research topics within MAB was another topic addressed by the Council, which agreed that a scientific programming group might be set up in consultation with the Bureau, to provide ongoing counsel on the future development of MAB.

The Council offered some suggestions for the setting of priorities over the next few years guided by the dual considerations of internal concentration and external "de-concentration" of activities within MAB. As regards the concentration of resources (human and financial) available through UNESCO's Regular Programme for MAB, there should be a trend towards concentration on two principal actions over the next two-year period at least: consolidation and reinforcement of the international network of biosphere reserves, and playing a prominent role in an intersectoral UNESCO initiative to produce multimedia information and educational material on the environmental issues of the day. These two poles of concentration provide *inter alia* opportunities for MAB to contribute to UNCED.

At the same time, this process of concentration within UNESCO should be associated with a process of "de-concentration" of the servicing of the different research networks within MAB at regional and international levels, which should be increasingly entrusted to co-management arrangements of various kinds.

Recommendations on this and other topics associated with stock-taking of past activities and planning of future work within MAB are given in Section 10.

4. MAB RESEARCH AGENDA

4.1 Overview of existing research networks

The Council examined recent progress, present status and proposed future activities in research activities within MAB. This examination was based on a written overview of MAB research networks, on more detailed information papers on each of the networks and on oral presentations of selected networks. A distillation of the main features of the various networks, as highlighted by this examination, is given below.

Strengthening of the scientific capacity of Sahelian countries in the agro-sylvo-pastoral domain

Objective: To strengthen the research, training and demonstration capabilities of Sahelian countries (CILSS member states) in the conservation and management of renewable resources and to promote regional co-operation in these two areas in collaboration with regional bodies, in particular with the Institut du Sahel/CILSS.

Status: Research on arid and semi-arid lands is currently focused on Africa, especially the Sahelian countries (with extra-budgetary assistance from Germany), around two major themes: restoration and rational management of sylvo-pastoral ecosystems in the arid Sahelian and Saharo-Sahelian zone; improvement of agroforestry systems in Sudano-Sahelian semi-arid environments. A successor to FAPIS (French acronym of a project entitled "Formation en aménagement pastoral intégré au Sahel" = Training on integrated pastoral development

in the Sahel, which began in 1980 and ended in 1989), major emphasis is on institutional support, training of researchers, research in support of development and strengthening of regional co-operation. The training component includes four regional courses dealing with the following subjects: a) Methods for vegetation studies applied to land management; b) Interdisciplinary research approaches and methods for rational resources management; c) Conservation of the environment and natural resources; and d) Biology and fertility of Sahelian soils.

Future directions and activities: Continuation of existing field projects with particular emphasis on training. Regional course on biology and fertility of Sahelian soils. Two regional seminars on pastoral development in arid zones and agroforestry systems in semi-arid zones.

Mediterranean network on agro-sylvo-pastoral systems

Objective: To improve knowledge and understanding for rational use of natural resources and prevention of their deterioration.

Status: Field projects covering a wide variety of situations from the shift away from agriculture in northern Mediterranean countries to the heavy human pressures and over-use of natural resources in southern Mediterranean countries. This diversity provides for a comprehensive review of problems relating to the planning and management of Mediterranean ecosystems and for the strengthening of North-

South co-operation. Activities contribute to FAO's Committee on Mediterranean Forestry Questions, "Silva Mediterranea".

Future directions and activities: Meeting to be held in order to take stock of progress in research and identify subjects for in-depth comparative study. Establishment of one or two working groups to give further consideration to and prepare the methodological and conceptual basis of priority topics selected for comparative study. Summary of research findings from several countries to be published in MAB Digest series. Strengthening co-operation with regional bodies, in particular CIHEAM (Centre international des hautes études agronomiques méditerranéennes) and its affiliated institutes.

Integrated ecological studies of urban systems

Objective: To improve knowledge and understanding of urban and peri-urban systems as a basis for planning and management and to make cities less imposing and impacting on their hinterlands upon which they depend with full involvement of the local populations. Most importantly, to make cities more liveable and human, and harmonize development planning with conservation and rational use of natural resources.

Status: Highly diversified network covering wide range of topics. Now in its third generation of field projects with studies in Paris and satellite new towns (France), Delft (Netherlands), Barcelona, Madrid and Valencia (Spain), Rome (Italy), Buenos Aires and Alta Gracia (Argentina), Sao Paulo, Bauru and Porto Alegre (Brazil), Kuala Lumpur (Malaysia), Seoul (Republic of Korea), among others. Emphasis on achieving effective interdisciplinarity, public involvement and co-operation with planners.

Future directions and activities: Convening of advisory panel to strengthen international links in urban ecology, review past research and

identify deficiencies. Aim to establish international network for "Ecological management of urban systems on a scientific basis", taking advantage of several proposed working panels and the keen interest of many MAB National Committees (e.g. Argentina, Brazil, China, Egypt, Germany, Italy, Republic of Korea, Mexico, Spain, Sweden, United Kingdom). Closer co-operation with HABITAT and INTECOL

Contributing to improved resource use in the humid and sub-humid tropics

Objective: To contribute to the development of sustainable land-use systems that are in tune with the social, cultural and biological characteristics of the peoples and ecological systems of the humid and sub-humid tropics in a time of rapid and far-reaching change.

Status: Loosely organized set of activities involving field activities in more than a score of countries in the humid tropics. Topics addressed include: ecological and economic sustainability of tropical rain forest management; integrated approaches to conservation, including buffer zone and transition area development; forest regeneration and ecosystem rehabilitation; long-term ecological studies on ecosystem structure and functioning. Fair amount of extra-budgetary support for field projects in some countries.

Future directions and activities: Expand the scale and dimensions of future initiatives, focussing on ecologically, socially and economically sustainable resource use in the humid tropics and strengthening "South-South" scientific co-operation. Encourage regional collaborative projects (e.g. on ecosystem rehabilitation in degraded land areas in Asia, on replacement of agro-ecosystems in tropical America). Close collaboration with such regional initiatives as tropical forest conference in Zaire in February 1992, proposed *in situ* evaluation of MAB activities in Africa, association of Amazonian

Universities (UNAMAZ). Reinforcement of links with TFAP, ITTO, etc.

Tropical Soil Biology and Fertility (TSBF)

Objective: To improve the efficiency of agricultural production in the tropics through better understanding and manipulation of intrinsic soil fertility, with particular emphasis on soil biological processes.

Status: Joint IUBS-MAB operation. Planning initiated in 1984, field studies in 1988-89. Thematically, based on ten specific objectives derived from five experimental principles (synchrony of nutrient release from organic matter with plant demands, soil organic matter, soil water, soil fauna, and integration of biological processes). Logistically, based on a dozen programme centres, linked to African Network Sites. Measures for inter-site comparison (site characterization, methodological handbook, integrating models). Coordination/stimulation through TSBF Board of Management with full-time programme co-ordinator and project officer based in UNESCO-Nairobi. Assessment in 1990 of the implications of current understanding of soil biological processes to global change. Publication in late 1990 of a report on progress and accomplishments within TSBF to date.

Future direction and activities: Substantive synthesis through TSBF-VI workshop in Martinique in July 1991. TSBF to end in its present form with termination of IUBS Decade of the Tropics in 1992-93. Development in Africa of major training programme in co-operation with the Rockefeller Foundation, and of collaborating demonstration networks in collaboration with international agronomic institutes such as ISBRAM, IFDC, IITA.

Responses of savannas to stress and disturbance (RSSD)

Objective: To develop a predictive understanding of ways in which savannas respond to natural and stresses and disturbance.

Status: Joint IUBS-MAB collaborative operation. Field programme design built around 20 hypotheses and 14 experiments. Field projects include studies in Australia, Brazil, Côte d'Ivoire, Nigeria, South Africa, Venezuela, Zimbabwe. Publications include initial synthesis and research hypotheses (1986), determinants of tropical savannas (1987), research procedure and experimental design (1988), Neotropical savannas (1990), Australasian savannas (1990), and savanna ecology and global change (based on October 1990 workshop at Harvard Forest).

Future directions and activities: Syntheses underway or planned (if funding becomes available) on such topics as: application of decision support systems as an aid to savanna management; economic driving forces and constraints in savanna land use; savanna conservation; characterization of savanna sites according to plant-available moisture and nutrients; woody plant-grass relationships; functional groups of savanna plants and animals; invertebrate herbivory; interactive effects of fire; influence of livestock on savannas. Savanna modelling workshop in March 1992. Final overall synthesis through symposium-workshop in July 1993.

Comparison of landscape pattern dynamics in European rural areas

Objective: To study past and present transformations of the European rural landscape to provide guide-lines for sustainable future rural land use.

Status: A comparative study established at the Trebon EuroMAB meeting (1989) to provide

information and insights useful for bringing together agricultural and environmental policies, entailing comparison of the ecological, administrative, judicial, social and cultural conditions of various regions within Europe. Scientific advisory committee met in Copenhagen (1990) and approved 14 contributing field projects from 11 countries.

Future directions and activities: Consideration of further proposals for contributing projects by co-ordinating committee at its meeting in Kiev (Ukrainian SSR) in early 1991. Identification of common problems and unifying concepts to be addressed by contributing projects, and proposal of common methodologies including comparable data storage and analysis procedures. Publication of overall project proposal in MAB Digest series in early 1991. Substantive and financial collaboration being sought for projects from various possible partners including CEC, INTECOL and IALE. Workshop on agricultural systems and determining factors of changes in the landscape in Rennes (France) in September 1991. Workshop on land-use changes in suburban zones and mining areas proposed for 1992, possibly in Leipzig.

Role of land/inland water ecotones in landscape management and restoration

Objective: To determine the management options for the conservation and restoration of land/inland water ecotones through increased understanding of ecological processes.

Status: Launched at an international workshop held with IIASA in Sopron (Hungary), May 1988. Designed around four key questions and 19 working hypotheses presented in MAB Digest 4 (1989). Scientific advisory committee has approved over 60 project sites in 26 participating countries. Synthesis volume on contributing research themes published as Volume 4 in MAB Book Series (1990). Two sub-networks on Fish and land/inland water ecotones and Surface water/underground water interactions

undertaken in collaboration with IHP, International Limnological Society (SIL) and other bodies.

Future directions and activities: Task force in Toulouse (France), early 1991, to draft methodological guidelines for publication possibly in MAB Digest series. Workshop on the role of land/inland water ecotones in the nitrogen and phosphorus cycles, (Mikolajki, Poland, May 1991). Joint symposium with SIL on Lowland river restoration (Sweden, June 1991). Latin America regional meeting on flood plain forests and high altitude wetlands (1991/92). Three seminars in conjunction with SIL World Congress in Barcelona (1992). Probable reinforcement of Zaire/Burundi project on Lake Tanganyika.

MAB Northern Sciences Network

Objective: To promote co-operation between concerned National Committees on main ecological issues relating to arctic zones.

Status: Launched in 1982 and re-organized after Helsinki (Finland) meeting in 1988. Decentralized network with secretariat at the Arctic Centre at Rovaniemi, Finland and regular newsletter. Meeting held in Rovaniemi in September 1990 to set up an international advisory group and establish co-operative activities on such topics as: using biosphere reserves for monitoring changes in northern environments; providing scientific basis for resolving land use conflicts; better understanding of people-environment interactions, particularly traditional land-use systems; functioning of birch forest ecosystems under different intensities of human impact.

Future directions and activities: Implementation of 1990 meeting recommendations including: development of incentives for community-based initiatives toward sustainable resource management; improvement of representativeness of network of northern biosphere

reserves and establishment of long-term monitoring as part of global monitoring activities (with possible establishment of international transects); development of models and methodologies to relate social effects and human responses to environmental changes in northern areas; review of ecological and environmental classification systems used in northern regions; continuation of birch forest ecosystem studies; elaboration of studies on tundra vegetation, the northern treeline ecotone, northern river basins and interaction of human communities with their environment in arctic coastal regions. Collaboration with recently (1990) established International Arctic Science Committee.

High mountain ecosystem research

Objective: To contribute to integrated mountain development.

Status: Several interlinked sets of IUBS-MAB comparative study activities on Tropical Mountain Environments. Two sub-regional networks focussed around ICALPE (Chambéry, France) and ICIMOD (Kathmandu, Nepal). In the Alps, emphasis on problems relating to the multiple use of high mountain ecosystems especially the effects of tourism on such ecosystems. In the Hindu-Kush-Himalayan region, priority given to prevention of erosion and to soil conservation. Meetings included: joint IUBS/MAB workshop on traditional use of natural resources in mountain ecosystems in Jujuy (Argentina), 1989; conference on transformation of mountain environments and consequences for global change in Tsakhadzor (Armenian SSR), 1989; joint ICIMOD/MAB symposium on mountain environmental management in Kathmandu, 1989; workshop on dynamics of African mountain resource use systems in Rabat (Morocco), 1990.

Future directions and activities: Initiation of new five-year (1991-95) comparative study on "Sustainable Future of Mountain Communities: Tourism in the Context of Climate Variability

and Change" to be decentralized to a non-governmental partner such as ICALPE or ICIMOD. Aim to study the use of, and investment in, mountain resources, emphasizing the role of tourism in the development of culturally, environmentally and economically sustainable economies; analyze patterns of development of tourism in different mountain regions (e.g. contrast between summer, winter or all-year tourism, slow development versus rapid growth); investigate past climate variability and possible climate change in mountain areas and their impact on mountain economies.

Sustainable management of small islands

Objective: To develop multidisciplinary research methods to define solutions to sustainable development problems of small islands.

Status: Field projects include Aeolian Archipelago (Italy), Gomera and Formentera (Spain), Iles du Ponant (France) and Commander Islands (USSR). Formal creation in Brest (France) in November 1989 of a non-governmental International Scientific Council for Island Development (INSULA) with aim of promoting sustainable development of small islands in all regions of the world. Publications include Volume 5 in MAB Book Series, *Sustainable Development and Environmental Management of Small Islands* (1990); proceedings of meetings at Mali Losinj (1987), Ouessant (1988) and Brest (1989); and production of three educational video films.

Future directions and activities: Support for consolidation of INSULA, with (a) organization of an international conference in late 1991 possibly in Italy on new technologies for the sustainable development of islands, (b) preparation of a computerized data base on the status of the environment of European islands, (c) holding of 1992 INSULA General Conference in Azores Archipelago (Portugal). Emphasis on evaluation and protection of

biological diversity (with interesting endemisms) of islands.

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Experience over the last few years indicates a number of ingredients that would appear important in the design and implementation of international collaborative research initiatives. These include: a clearly defined set of objectives; themes and research questions; overall general hypothesis and specific working hypotheses that are capable of being falsified through observation and experiment; combination of both scientific and practical goals; selective rather than comprehensive approach; mechanisms for substantive review, monitoring and evaluation of contributing field projects; emphasis on the quality of research; broad programme of activities over a predetermined time period, including provisions for periodic synthesis; possibilities of mutually supportive links between UNESCO and collaborating organizations and institutions in the servicing and financing of the research programme.

Several of the more finely focused research networks (e.g. those on ecotones and tropical soil biology and fertility) bring together a large proportion of these ingredients. In other cases, the research networks comprise a diffuse mix of loosely-knit projects.

The Council welcomed the plans of several networks to prepare substantive syntheses of research findings, which provided a firm basis for subsequent evaluation of the effectiveness and impact of a given effort. Certain networks would be coming to a close, at least in their present form, during the 1992-1993 period.

In welcoming this process of synthesis, evaluation and closing down, the Council expressed the wish that each of the research networks work towards such a process during the period 1991-1995. On average, two synthesis-evaluation exercises might be undertaken each year over this period. For certain of the more diffuse networks (e.g. those in the humid tropics or in urban systems) the synthesis *cum* evaluation exercise might be undertaken on a regional or thematic basis.

4.2 New research orientations

The Council reviewed progress in the elaboration of the four new research orientations approved by the Council at its ninth session in November 1986:

1. Ecosystem functioning under different intensities of human impact;
2. Management and restoration of human-impacted resources;
3. Human investment and resource use; and
4. Human response to environmental stress.

As an example of how the process of elaboration was being approached, Mr Michael Little provided a resumé of task force meetings that had been organized in 1989-90 in the USSR and Germany on the fourth orientation. As a result of these meetings, a research framework was developed around five themes dealing with human response to:

- (a) harsh, constraining and limiting environments,
- (b) social and technological changes in the environment,
- (c) environmental hazards,
- (d) population displacement to new environments, and
- (e) changes in resource use.

It was hoped that this orientation will serve as a focus for human-oriented studies, thus involving social scientists more closely in MAB, and that it should give particular direction to urban ecosystem studies.

In more general terms, the Council reiterated that the four research orientations should serve as a motor for re-examining and renewing the overall approach and methodology of MAB. Important in this respect was the recognition that the concerns and substance of the four orientations were crucial ingredients in approaching the issue of sustainable development. The Council also emphasized the need to focus more on the "human" in MAB, and particularly on learning from indigenous people and their traditional knowledge. One delegate also proposed that the question of human rights relative to the environment (e.g. right to clean water, safe

environment, etc.) be given consideration in such studies. Another delegate suggested that the programme might better be called "People in the Biosphere" or "People in the Changing Biosphere".

4.3 Regional research networks

The Council was pleased to note the further development of the EuroMAB network following its meetings in Berchtesgaden (1987) and Trebon (1989) and welcomed the proposal for a third meeting to be held in Strasbourg (France) in September 1991.

The Council also welcomed proposals for the development of other regional networks such as: on the rehabilitation of degraded land areas in the Asian tropics; sub-regional co-operation on the replacement of agro-ecosystems; South/South co-operation for the sustainable development of tropical forest landscapes;

Individual delegates provided indications of specific activities contributing to MAB research in particular networks and geographical regions, including the convening by Zaire in February 1991 of an international co-ordinating workshop on educational and scientific activities for the rational management of African humid tropical forests; links between Spain and Equatorial Guinea in tropical forest conservation; the initiation by Egypt of studies on the socio-economic and environmental implications of environmental sprawl around Alexandria, and a programme on wastewater management.

4.4 Consideration of new research proposals

The Council examined three proposals for new collaborative research efforts:

Mountain tourism and climatic change

Following a presentation by Mr Martin Price, the Council approved the launching of a new research operation on the theme of "The sustainable future of mountain communities: resources and tourism in the context of climate variability and change". The study will be undertaken during the period 1991-1995 as a joint venture of UNESCO-MAB and the International Mountain Society, in collaboration with other professional associations and mountain research institutes such as ICIMOD in Kathmandu and ICALPE in Chambéry. It will build on the conceptual and logistic frameworks developed during the last two decades within MAB Project Area 6 (Impact of Human Activities on Mountain and Tundra Ecosystems), and will be shaped by the four new research orientations within MAB, particularly that on "Human Investment and Resource Use". A draft proposal document was tabled during the Council session, and will be sent out widely for comment and reaction in late 1990, with a view to subsequent publication in 1991 in the MAB Digest Series. A report on the responses to this proposal document, and institutional arrangements for the implementation of the project, should be submitted to the 1991 meeting of the MAB Bureau.

Functional significance of biological diversity

The Council approved proposals for a joint IUBS-SCOPE-UNESCO research initiative on biological diversity (see Section 5.1 of this report).

Chernobyl Ecological Science Network

Delegates from the USSR, Ukrainian SSR and Byelorussian SSR requested that the Council endorse the proposal for the creation of a Chernobyl Ecological Science Network within MAB, for which the secretariat would be provided by the Byelorussian Academy of Sciences. This network might treat subjects such as ecosystem functioning under different intensities of radionuclide contamination; management and restoration of natural resources in areas polluted by radionu-

cleides; human investment and use of the resources in contaminated areas; and human response to radionuclide pollution stress. In view of the gravity of the regional and world-wide consequences of the Chernobyl accident, and in line with the decision by the 135th Session of UNESCO's Executive Board that UNESCO should be involved in activities dealing with Chernobyl, the Council approved the motion in principle. The Council requested the MAB National Committees of the countries concerned to prepare a detailed project outline, in consultation with UNESCO/MAB, as the next step in project development.

4.5 International Pilot Projects

The Council took note that 31 proposals for MAB International Pilot Projects had been submitted to the Secretariat for analysis. The Secretariat presented its analysis on each proposal to the former and new Bureau members. The Bureau entrusted Mr Goerke, the Vice-president, to examine the results of this analysis and to submit proposals for decision. The 31 proposals were classified as follows:

- 10 acceptable
- 16 not acceptable mainly due to lack of information
- 3 to be discussed
- 2 to be deferred

The Bureau recommended approval of the 10 acceptable proposals and also one among the three submitted for discussion (proposal No. 28, submitted by Byelorussia). The list of the 11 proposals approved is as follows:

Byelorussia

- Ecological and radiation monitoring of ecosystems on the testing grounds of the BSSR, using remote sensing and ground-truthing.

Egypt

- Sustainable development in Wadi Allagi.

Germany

- Ecosystem research in the Bornhöved Lakes District, North Germany
- Ecosystem research project in the Wadden Sea National Park of Schleswig-Holstein
- Ecosystem research project in the Wadden Sea National Park of Lower Saxony

Madagascar

- Urbanization and living conditions in the zones of urban expansion of the city of Antananarivo
- Impact of human activities on the value and resources of the coastal zone between Morondava and Belo/ Tsiribihina

Malaysia

- A controlled study of the long-term impact of hydroelectric project development on human ecology in the northern peninsula of Malaysia

Saudi Arabia

- Environmental support of nomads, north-central. Saudi Arabia.

Yugoslavia

- Ecological foundations for an integrated environmental management strategy for the lower Neretva Valley

Zaire

- Pilot activities for the conservation of the Mayombe forest ecosystem (Luki Biosphere reserve)

Furthermore, the Bureau underlined the necessity to improve the procedure and criteria for evaluating the proposals for MAB International Pilot Projects. To this end it was suggested that the evaluation be done by the scientific committees of networks to which the project proposals relate.

5. BIOSPHERE RESERVES

5.1 Biological diversity

Mr Otto Solbrig made a presentation to the Council on a new proposal for studying the scientific aspects of biological diversity, which had received relatively little attention until now in the upsurge of general interest internationally on biological diversity. He informed the Council that IUBS and SCOPE had held several meetings on this subject in the course of 1988-1989 in order to outline the scientific questions that needed to be posed. These questions were:

1. the role of biotic and landscape diversity on functional properties and their response to change;
2. global comparative biogeography;
3. long-term monitoring of biological diversity as an indicator of change; and
4. conservation of genetic resources of wild species.

MAB was invited to join forces with IUBS and SCOPE in particular to explore the second and third questions using the international biosphere reserve network, as appropriate, as a tool for the studies required. The MAB Bureau at its February 1990 meeting had warmly welcomed this proposal and had requested that a working paper be prepared for the MAB Council. Mr Solbrig had been invited by the Secretariat to prepare such a paper which discussed a general theory of biological diversity and a series of hypotheses. These included, for example the hypothesis that increased disturbance favours species with short life cycles (the "r" species), or that primary productivity in an ecosystem is dependant on a certain degree of biological diversity although the relation between

primary productivity and biological diversity is not linear. Mr Solbrig expressed the hope that these hypotheses would be refined at a series of meetings to be held in 1990-91 in order to develop a research programme.

Mr Talal Younes of IUBS informed the Council of the proposed partnership of IUBS, SCOPE and UNESCO to develop the programme of work around the four scientific questions identified above, which would also involve other inter-governmental programmes and organizations such as UNEP and FAO, and NGOs such as IUCN and the World Resources Institute. This effort could also contribute to the potential IGBP core project on ecological complexity. Each of the three main organizations would have its role to play in the development of the four research themes over the coming years. As concerns MAB, the Council's attention was drawn to the proposed UNEP/UNESCO Conference on monitoring of biological diversity, (i.e. the biogeography of biological diversity) which was to be hosted by MAB-USSR in October 1991.

The Council took note of Mr di Castri's remarks that this type of study was highly relevant to UNESCO since it would help to strengthen the "S" of UNESCO, not only from the theoretical scientific point of view but also on a practical level as it would require in-house co-operation for example between the programmes on the marine and the terrestrial environments, on biotechnology, etc. It would also serve to boost the scientific and networking functions of the international biosphere reserve network. The topic of biological diversity was furthermore of high priority for all governments and their decision makers, as was testified by the interest in establishing a conven-

tion on biological diversity under the leadership of UNEP. The joint scientific endeavour would in addition create a visibility required for UNESCO activities for UNCED.

The Council first of all stressed that the topic of biological diversity was one of the priority scientific questions of the 1990s that needed to be addressed by MAB. It enthusiastically welcomed the proposal for a joint IUBS/SCOPE/MAB programme on the topic of biological diversity and expressed its interest in the content of the draft paper prepared by Mr Solbrig. It requested that this paper should be published as a MAB Digest as soon as possible and indicated support for the proposed programme of meetings.

Attention was drawn to the difficulty of defining what to study under the broad term "biological diversity", which was certainly not confined to the mere counting of species. It was necessary to identify, for example, what exactly one should monitor in space and time to understand the ecosystem function of biological diversity and its biogeographical distribution: indeed, should one monitor selected organisms, selected populations of a given species, the so-called "keystone" species, the "r" versus the "k" species, the "connectance" of species in relation to ecosystem stability? Should one set up a series of vast cross-continental transects, based as much as possible on existing biosphere reserves, as was being studied in the USSR? And how to measure the global trends relating to biological diversity – was it really decreasing as dramatically and rapidly as many scientists report, or were there cycles over the longer time scale?

The Council noted that although the proposal did not concern work to refine the estimates of the number of species on earth or to increase the numbers of species described scientifically, MAB could not ignore the problem posed by the worldwide lack of qualified taxonomists. Indeed, as had been said in many instances, taxonomists themselves were an "endangered species" and there was a pressing need for a renaissance of taxonomy. For this, the Council recommended that every effort be made to create a working group on this subject at UNCED. MAB, working with the

Smithsonian Institute and the ongoing Smithsonian-MAB Biodiversity Program, should also step up the training of taxonomists and biological inventories in biosphere reserves.

The Council noted that the conservation of biological diversity was a separate issue from studies leading to a theory of biological diversity. Logistically, however, the two would find a common denominator in biosphere reserves, particularly those reserves with long data sets that could serve to better understand changes in ecosystem structure and function over time. Here it was stressed that biosphere reserves make up only a part of estimated 3,500 protected areas around the world, themselves representing only a fraction of the earth's land surface and its biological diversity. If it is considered that "in order to protect, one needs to know", then the work of the IUBS/SCOPE/MAB proposal would serve greatly in promoting conservation of biological diversity in general.

The Council furthermore noted that this joint activity would provide UNESCO input for the scientific basis of the proposed convention on biological diversity being developed by UNEP. One aspect being discussed in the preparatory meetings on this proposed convention was the need for a financial mechanism whereby the "rich" communities making a profit from biological diversity (for example, through using wild germplasm to breed high yielding varieties of crops) should compensate and actively help the "poorer" communities (and here one could consider the ecological research community) to conserve their biological diversity.

5.2 Long-term monitoring and research

Mr W. Goerke, Chairman of MAB-Germany and Mr Neronov, Secretary of MAB-USSR, made brief presentations to the Council on this topic. Mr Goerke drew attention to the importance of long-term research in order to understand better environmental changes, whether natural cycles or

human-induced trends. The main problem was to identify which parameters to monitor in space and time for specific purposes. There was also a need to avoid duplication with other monitoring efforts underway, for example by WMO for climatological data, as well as the imperative to maintain quality control. Mr Goerke proposed that selected biosphere reserves be set up as soon as possible as environmental monitoring sites, for which his own country, Germany, was ready to co-operate. Other requirements for a successful long-term research and monitoring programme would be the long-term security of the observation and research sites and the continued involvement of the scientific community, as well as other international monitoring endeavours such as those promoted by GEMS.

Mr Neronov stressed the need to follow up on the MAB meeting in January 1990 on site characteristics of biosphere reserves at which it was recommended to select a number of biosphere reserves for long-term ecological research and monitoring. Also, the 1989 UNESCO/UNEP Conference on Remote Sensing in Moscow had stressed the use of the international biosphere reserve network for obtaining ground truth for remotely-sensed data and for long-term baseline monitoring, as well as the need for detailed maps to evaluate ecosystem changes. Biosphere reserves could in addition be used to set up large scale transects across continents that could use standard methods and modern technologies for data collection, analysis and modelling. Mr Neronov called for a task force to look into this matter in more detail.

Mr Little, Vice-Chairman of MAB-USA, also called for the implementation of the recommendations of the January 1990 meeting on site characteristics, especially the one concerning the selection of 20-40 biosphere reserves for long-term research and monitoring on global change. He indicated that a special task force should be set up for identifying the sites and types of parameters to be monitored.

There was obviously a great deal of interest and good will to start up a concerted long-term monitoring programme using biosphere reserves

but the Council recognized that to do this, MAB would have to seek outside partners to carry such a programme forward, to develop the methodologies, promote data collection and exchange, as well as the synthesis and dissemination of results. One opening may be offered by the inter-agency meeting convened on 3-7 December 1990 by GEMS/UNEP to explore the institutional means to establish a global network of sites for monitoring terrestrial ecosystems. Finally, the Council welcomed the intention of UNESCO to prepare a booklet on long-term ecological research.

5.3 Strengthening the legal status of the international biosphere reserve network

In reference to the discussion on the use of biosphere reserves for long-term research and monitoring, the Council considered the need to strengthen the legal basis of the international biosphere reserve network, for example through a convention. The Council realized that such a legal framework could have many advantages, for example, to:

- provide better security for biosphere reserves for long-term research and monitoring;
- increase the visibility of the international network and enhance its status, which would be indispensable for consideration at UNCED;
- help attract multilateral support for biosphere reserves, particularly in developing countries. In this manner it could greatly reinforce the functioning of the world network and enhance international co-operation.

Such a legal framework should in particular stress the specificity of biosphere reserves as representative ecological areas where local populations play an integral role in their protection and management. One of the most attractive features of the biosphere reserve concept was its flexibility and

the way in which it could be adapted to very different ecological and socio-economic contexts: thus the biosphere reserve concept in densely populated, largely modified areas was implemented in a different way than in areas with large tracts of relatively undisturbed natural systems. The perception of the role of biosphere reserves in promoting sustainable rural development, environmental education, training and scientific research was also different. Nevertheless, all biosphere reserves were linked into an international co-operative network through a common understanding of purpose and functions.

The Council recalled that biosphere reserves were established under the appropriate national legislation in force in each country, which maintains full sovereignty and responsibility for the biosphere reserves in its territory. An international legal framework, whatever the form, would in no way impinge upon this situation. It could also enhance local initiatives to set up biosphere reserves, giving them an increased national and international standing. In the Council's debate, one country that had not yet proposed biosphere reserves indicated that the existence of an international legal framework would in fact facilitate their establishment in that country.

The Council accordingly recommended that the Secretariat set up a group of legal experts, using the existing expertise of UNESCO and the law commission of IUCN, to make proposals of the types of legal framework (protocol, understanding, model law, convention, etc.) that could be considered. The Council recommended that in making this study, special attention should be given to the points elaborated above, as well as the need to articulate the legal framework, whatever the form, with existing conventions (such as World Heritage, RAMSAR), and also the proposed Convention on Biological Diversity being prepared by UNEP. The Council advised a certain caution, however, since initiatives for establishing such legal frameworks often foundered on complex technical and political issues and remained still-born. The Council suggested that the draft text for such a framework should be clear and simple, spelling out the principles of biosphere reserves

and the international network that they constitute. This pragmatic approach should help its easy ratification by all countries, including those with federal systems or special local priorities.

In conclusion, the Council requested the Director-General to set up a working group to examine the status of the international biosphere reserve network.

5.4 Implementation of the Action Plan for Biosphere Reserves

The Council welcomed indications of a number of initiatives for the reinforcement or creation of biosphere reserves. These indications included the proposed establishment by Poland, the Ukrainian SSR and Czechoslovakia of a biosphere reserve in the Carpathian mountains, which would include contiguous areas along the border zones of the three nations. The Council noted that this proposal had been adopted by the representatives of the three partners at the regional MAB Conference held in Kiev in June 1990. A small meeting of the scientists directly involved in this work would take place in Cracow in the spring of 1991.

5.5 Proposals for new biosphere reserves

The Council noted that the Bureau had met during its 11th session and had been able to consider proposals for new biosphere reserves. The Bureau had examined ten new proposals for biosphere reserves and a request to re-examine a proposal that had been deferred by the Bureau in 1989.

The Bureau had first recalled that biosphere reserves were a central part of MAB and hence required an in-depth and multi-expert examination procedure. Such a rigorous evaluation on the basis of well-documented proposals required a fixed, strictly respected deadline for submission in adequate time before the Bureau meeting. The Bureau had, in fact, at its last meeting in February

1990, requested that new proposals for biosphere reserves be submitted to the Secretariat at least two and a half months before the Bureau meetings. For this meeting, the Secretariat had tried to apply this procedure but a number of proposals were submitted later than the 31 August 1990 deadline.

The Secretariat had, however, been able to send the new proposals for evaluation to Messrs. Batisse, Gregg and McNeely, as well as to the members of the former Bureau. The Bureau expressed its thanks to these three experts for their work, which had greatly facilitated the task of the new Bureau.

Taking account of the evaluations presented to the meeting, the Bureau made the following decisions, which were subsequently noted by the Council:

El Kala (Algeria - 2)

The Bureau noted the importance of this site as it is one of the rare protected areas on the south shore of the Mediterranean covering the land-sea interface. The Bureau requested that MAB-Algeria provide:

- a good map clearly showing the zonation of the site into the core, buffer and transition areas in both the terrestrial and marine zones;
- further information on the co-ordination and management mechanisms for the biosphere reserve as distinct from the existing National Park, especially with regard to local populations;
- further information on proposed means for enhancing and co-ordinating research in the reserve.

The Bureau also recommended that the Secretariat keep contact with the World Bank, which was organizing a consultant mission to the site for December 1990, to explore with MAB-Algeria means to strengthen this biosphere reserve in the future. With these observations in mind, the Bureau approved the Réserve de Biosphère d'El Kala.

Shennongjia (People's Republic of China - 8)

The Bureau requested that MAB-China provide further information on:

- the legal status of the different core, buffer and transition areas;
- the co-ordination mechanism for protection, research and rural development;
- the research programmes underway.

With these observations in mind, the Bureau approved the Shennongjia Biosphere Reserve.

Mont Ventoux (France - 7)

The Bureau noted with satisfaction that this biosphere reserve had been created *ex nihilo* and that the core areas had received legal protected status on 5 November 1990 as "arrêtés de protection de biotope". The Bureau approved the Réserve de Biosphère du Mont Ventoux.

Berchtesgaden Alps (Germany - 4)

The Bureau requested that MAB-Germany provide more information on the co-ordination mechanisms between different zones, especially with respect to the transition zone, which was a new element added on to the existing national park. The Bureau approved the Berchtesgaden Alps Biosphere Reserve.

Wadden Sea of Schleswig-Holstein (Germany - 5)

The Bureau noted that MAB-Germany had made this proposal on the understanding that it would nominate the other part of the German Wadden Sea of Lower Saxony very soon. It further noted that the intention was to combine it with the existing Dutch Waddensea Biosphere Reserve, as well as the Danish part, with a view to establish a tri-national biosphere reserve covering this whole coastal ecological system. Discussions were underway in this regard through the MAB National Committees of the countries concerned and

also through the tripartite Waddensea Secretariat hosted by Germany.

The Bureau approved this proposal on the understanding that MAB-Germany would propose the Lower Saxony part of the Wadden Sea for the next meeting of the MAB Bureau in 1991. It furthermore requested that MAB-Germany provide more information on the zonation, notably on the buffer zones and transition areas, as well as to consider extending the biosphere reserve towards the land side to cover some of the land-sea interface and to ensure participation of resident populations.

Schorfheide-Chorin (Germany - 6)

The Bureau recognized that this site was typical of the modified mosaic of natural ecosystems of this part of Europe in which the core areas were inevitably small and dispersed. It recommended that MAB-Germany study the possibility of expanding the currently identified core areas. With the recent and rapid changes in administration in this part of Germany and the trend towards extensification of agricultural production, sites such as Schorfheide-Chorin had great potential for environmental protection and experiments in ecosystem restoration. The Bureau therefore wished to encourage MAB-Germany in developing this site along the principles of the Action Plan for Biosphere Reserves and for which special legislation had been promulgated.

The Bureau further noted that this site was contiguous to a Ramsar wetland site in Poland and recommended that the German authorities also consider nominating the Schorfheide-Chorin area for inclusion in the list of Ramsar sites to increase international co-operation. With these observations in mind the Bureau approved the Schorfheide-Chorin Biosphere Reserve.

Maya (Guatemala - 1)

The Bureau noted that this site, which constituted a complex ensemble of national parks, protected biotopes and their surrounding areas of the Peten region, had been declared a biosphere reserve at national level by a special congressional decree in

February 1990. It included the Tikal National Park, which was also a World Heritage site, and covered some of the richest tropical ecosystems on earth. There were possibilities for co-operation with Belize and Mexico, which both had protected areas contiguous to the Maya biosphere reserve in Guatemala. The Bureau felt that this site, which was the focus of significant international support, could become an "illustrative model" of a biosphere reserve. The Bureau furthermore recommended that the Secretariat contact the Mexican government at the highest level to encourage the Mexican authorities to propose the Calakmul Biosphere Reserve for inclusion in the international biosphere reserve network. With these observations in mind, the Bureau approved the Maya Biosphere Reserve.

Amboseli (Kenya)

The Bureau greatly welcomed this important proposal that concerns an area of very high visibility, located in the vicinity of UNEP Headquarters and the UNESCO Regional Office, and which has the potential to become a model of its kind.

The Bureau noted, however, that the nomination form had not been adequately completed and did not fully provide the necessary information on several matters of major importance. There was need in particular to identify a true core area and to give it adequate protection from visitors. It was also necessary to define an exact delineation of the buffer zone and to indicate the provisions made to ensure full participation of local people in the management of the area and in the sharing of benefits returned.

The Bureau deferred the proposal and invited MAB-Kenya, in consultation with the Secretariat, to consider the adjustments to be made and to revise the proposal so that it can be submitted as a priority for formal approval at its next meeting.

Bogd uul (Republic of Mongolia)

The Bureau noted that this proposal came as a follow up to a consultant mission to Mongolia in July

1989. It covers an interesting ecotone between the steppe and the mountain forests in an area next to an urban and industrial system. The Bureau noted that there were some difficulties with the proposal at present, e.g. the relative lack of research capacity, the need to define a viable protected core area, the uncertainty on management objectives, including co-operation with the local population, and the need to supply a more detailed map.

The Bureau thus deferred the proposal and requested the Secretariat to contact MAB-Mongolia to obtain further information on how this site, which had been protected for over two centuries, was to be developed as a biosphere reserve and if possible present a revised proposal for examination by the MAB Bureau at its next session.

Great Gobi (Republic of Mongolia - 1)

The Bureau recommended that MAB-Mongolia be encouraged to strengthen the protection and management of this most important site of international value for biodiversity, made up of two vast isolated areas, and for which very few park personnel were available. The Bureau also recommended that the park/biosphere reserve authorities ensure that the open water surfaces were kept available for wild animal populations, for example, by providing wells for the people in this area.

Further information should be provided on the means by which local people are associated with the management of the biosphere reserve. With these observations in mind, the Bureau approved the Great Gobi Biosphere Reserve.

Akure (Nigeria)

The Bureau recalled that this proposal had been deferred by the Bureau in 1989. The Bureau noted that the proposal continued to show certain weaknesses that were putting in question its potential value as a biosphere reserve. Underlining the great value of protecting what remains of the tropical forest in West Africa, it felt that the relatively small size of the core area and the uncer-

tainty about the actual pressure from surrounding populations spoke for a thorough review of the proposal, including consideration of the management requirements outside the core. The possibility of establishing a cluster biosphere reserve with several core areas should, in particular, be explored.

With these considerations, the Bureau deferred the proposal and requested the Secretariat to explore with the MAB Committee - possibly through a consultant mission - the possibility of establishing a biosphere reserve - or a cluster biosphere reserve - ensuring *inter alia* the long-term protection of representative samples of the West African forest in Nigeria.

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The representative of Germany informed the Bureau of the proposals in his country concerning the establishment of two new biosphere reserves, including a coastal reserve, and the extension of two other existing biosphere reserves in the eastern part of reunified Germany.

The Bureau welcomed the proposals of MAB-Germany with great satisfaction as they aim at the constitution of a complete network of biosphere reserves in this country. The Bureau invited MAB-Germany to proceed, in consultation with the Secretariat, to finalize these proposals as necessary so that they may be submitted in priority for formal approval by the Bureau at its next meeting.

The representative of Brazil informed the Bureau of the proposals in her country concerning the establishment of a biosphere reserve in the Atlantic Forest of Brazil. The Bureau welcomed the proposal of MAB-Brazil with great satisfaction as it concerned extremely threatened ecosystems of the utmost importance from the point of view of biological diversity. The Bureau expressed the wish that a multi-functional biosphere reserve be set up as soon as possible to strengthen the protection and study of these ecosystems.

The Bureau invited MAB-Brazil, in consultation with the Secretariat, to proceed with the finalization of the proposal so that it could be submitted in priority for formal approval by the

Bureau at its next session. In this regard, the Bureau felt that the following possibilities should be explored:

- establishment of a "cluster" biosphere reserve composed of a number of land units for protection and research purposes;
- setting up of a co-ordination mechanism between all the units of the "cluster" and the local authorities concerned;
- establishment of an overall plan defining the objectives of protection, of research and monitoring, and of sustainable development.

Finally the Bureau noted that with the eight new biosphere reserves that it had just approved, two of which were from countries not previously having presented biosphere reserve proposals before, the international biosphere reserve network now consisted of 293 sites in 74 countries.

5.6 Monitoring biosphere reserves

Implementation of Bureau recommendations for biosphere reserves approved in February 1990

The Bureau took note of the responses from the MAB National Committees for the following biosphere reserves that were presented in a document prepared by the Secretariat: Laguna de Pozuelos (Argentina), Niagara Escarpment (Canada), Polana and Sumava (Czechoslovakia), and Mananara Nord (Madagascar).

The Bureau thanked the MAB National Committees of the countries concerned for this information, which would be used to update the data sheets on these biosphere reserves maintained by the World Conservation Monitoring Centre. The Bureau requested the Secretariat to contact the MAB National Committees of the countries that had not responded to the Bureau's recommendations (Palawan-Philippines, Mammoth Cave Area-USA, and West Estonian Archipelago-USSR)

Status of other biosphere reserves

The Bureau was informed by the Secretariat of four cases where it had received reports of perceived threats or incompatible activities since the last Bureau meeting in February 1990:

Lauca (Chile)

The Bureau requested the Secretariat to continue to consult the Permanent Delegation and the authorities of Chile to obtain a reply to its enquiry on the threats of oil and mineral extraction within the biosphere reserve.

Yasuni (Ecuador)

The Bureau expressed concern that this biosphere reserve had been subject to a rapid modification only a short time after its approval. Indeed, the Ecuador authorities had informed the Secretariat that 215,000 ha of the legally constituted national park had been excised in April 1990 in favour of the Huarani communities. The Bureau noted the intention of the Ecuadorian authorities to organize a consultant mission to prepare a revised management plan for this site, including the addition of other areas to the south and to the south west in the Curaray area, and expressed the wish that the report of this mission, as had been indicated by the Ecuadorian authorities, would be transmitted to the Secretariat for submission to the Bureau at its next meeting in 1991.

Cévennes (France)

The Bureau noted the proposal to construct a dam at La Borie in the transition area of the biosphere reserve. The Bureau expressed its concern regarding the protection of the integrity of a site located in the Cévennes Biosphere Reserve, considered hitherto as a model. On the basis of applying the principles of the Action Plan for Biosphere Reserves, the Bureau recommended that the French authorities concerned proceed to organize all appropriate consultations with the MAB National Committee in order to study all the implications of the eventual construction of heavy infrastructure within the Cévennes Biosphere Reserve.

Dofiana (Spain)

The Bureau noted the Secretariat's report on the threats to this site from agricultural activities upstream of this wetland biosphere reserve, as well as from a project for tourist development. It took note that the Director-General of UNESCO had written to the Minister of Foreign Affairs of Spain on this matter, recalling the moral commitment of the Spanish authorities to take the necessary measures to protect the site in line with the Action Plan for Biosphere Reserves. In addition, the Conference of the Contracting Parties to the Ramsar Convention on Wetlands of International Importance (Dofiana being also a Ramsar site) at its fourth session in July 1990, had made a recommendation to the Spanish authorities that they take specific measures to meet the Park's water requirements and maintain its ecological character.

The Bureau was informed that the Spanish delegation to the Council session had indicated that a reply to the Director-General's letter was being prepared as well as a report synthesizing the problems involved, with recommendations to mitigate the situation. A meeting was planned by MAB-Spain in conjunction with the Ramsar Secretariat and Spanish Committee in April-May 1991 to bring all the parties concerned together to discuss these recommendations. The Bureau thanked MAB-Spain for this information and expressed the wish that this report would be submitted for examination at its next session.

IUCN and monitoring the international biosphere reserve network

Following the invitation of the Bureau at its last meeting, IUCN prepared a project document to identify ways in which the progress of individual biosphere reserves in implementing the Action Plan for Biosphere Reserves could be monitored.

The Bureau thanked IUCN for making this proposal and considered that the general question of the implementation of the Action Plan for Biosphere Reserves should be taken up by the Advisory Committee on biosphere reserves whose establishment was recommended by the Council.

5.7 Conclusions and recommendations

On the basis of a document prepared by the Secretariat, the Council adopted the following conclusions and recommendations:

1. The general interest in biosphere reserves has probably never been greater: there is interest in the international network of biosphere reserves, which, however imperfect, can serve as a basis for:
 - co-ordinated *in situ* conservation of biological diversity;
 - baseline research and monitoring for global change studies;
 - the reconciliation of conservation with sustainable development.

Every effort should be made to build upon this interest and to integrate the triple concerns for conservation, research and monitoring, and sustainable development into each existing biosphere reserve. In all instances it was necessary to recall that biosphere reserves were an initiative of UNESCO's MAB Programme: however, all organizations and individual scientists should be encouraged to develop biosphere reserves whenever possible.

2. In spite of this interest, the Council admitted that the quality of the international biosphere reserve network, currently with 293 sites in 74 countries, was highly uneven and lacked credibility as an operational network. There were still too many sites on the list of biosphere reserves that were designated in the early stages of MAB and for which the MAB National Committees concerned had not taken the necessary steps to make them comply more to the Action Plan for Biosphere Reserves. These non-fully-functioning sites needed to be "weeded" out. In parallel, there was no proper mechanism for monitoring the status of individual biosphere reserves: MAB National

Committees very often were powerless, or out of the line of decision making for biosphere reserve management, or simply ignorant of certain activities proposed or taking place in the biosphere reserves within their countries and which were incompatible with their international status under MAB.

To mitigate this situation, the Council recommended that:

- *an advisory group for biosphere reserves be constituted to evaluate all biosphere reserves, propose a delisting procedure for the non-functioning sites, screen new proposals with rigour, review the status of the implementation of the Action Plan for Biosphere Reserves and make proposals for making the international network truly functional;*
 - *a feedback mechanism be examined by which the status of individual biosphere reserves can be monitored. As recommended by the MAB Bureau in February 1990, IUCN and the World Conservation Monitoring Centre should give the international biosphere reserve network the attention it merits.*
3. There were still noticeable gaps in biogeographic coverage for certain countries/biomes such as tropical forests, tropical grasslands as well as in the Arctic. There were also too few biosphere reserves in coastal areas. Indeed, to date there had been few attempts to establish biosphere reserves on the land/sea interface, for example by extending the limits of existing sites that stop at the seashores of continents or islands, or by seeking opportunities for new biosphere reserves.

The Secretariat should contact the MAB National Committees or focal points in the countries concerned by the "gaps" in biome coverage to encourage the nomination of biosphere reserves in these countries and region.

The results of the UNESCO-IUCN workshop on the application of the biosphere reserve concept to coastal areas should be finalized and widely disseminated. A follow up meeting should be envisaged in the coming future.

4. The international network was not functioning as it should since the necessary links had not been adequately forged.

The "networking" function should be strengthened in terms of:

- *in situ conservation of biological diversity: A review should be conducted in co-operation with IUCN and the World Conservation Monitoring Centre on the coverage of the network in terms of areas of rich biological diversity, Vavilov centres, habitats of special conservation interest (such as peatlands, undisturbed grasslands, old growth forest), as well as traditional use areas. (Note that IUCN, as part of the 1992 World Congress on Protected Areas, will be preparing a review identifying key sites and species for conserving biological diversity);*
- *exchanges of experience in promoting sustainable development. Biosphere reserves should become the focus of more integrated development projects aiming at the sustainable use of natural resources and a synthesis of the experience gained in these projects should be prepared and widely disseminated (see also conclusion 8 below);*
- *MAB National Committees and other international organizations should be encouraged whenever possible to use the biosphere reserves in their countries for their contribution to the MAB research programme and strengthen the research facilities within biosphere reserves accordingly. The MAB Bureau should give preference to granting MAB Young Scientists' Research Awards for research projects to be conducted in biosphere reserves.*

- *the Secretariat should adopt a communication policy, for example by sending circular letters and information notes directly to biosphere reserve managers/personnel and also in providing news on individual biosphere reserves in Info-MAB.*
5. There was a need to define clearly the role of biosphere reserves within the current surge of interest in biological diversity.

The Council recommended that MAB's role could come under two headings:

- *development of a joint IUBS-SCOPE-UNESCO programme on "Ecosystem function of biological diversity" following the outline of Biology International Special Issue No. 22. No other international organization is addressing this scientific aspect of biological diversity. It was therefore proposed that a series of testable hypotheses regarding the role of biotic and landscape diversity on functional properties and their response to change and on global comparative biogeography be prepared;*
 - *consideration of the Action Plan for Biosphere Reserves (and also the natural part of the World Heritage Convention), as appropriate, particularly given the Council's general recommendation to give enhanced status to the international network of biosphere reserves, in the draft legal instrument on biological diversity currently being prepared by UNEP. The Secretariat has closely followed this initiative through the aegis of the Ecosystem Conservation Group (UNEP, FAO, UNESCO and IUCN): UNEP intended ultimately to have the legal instrument ready for adoption by UNCED in June 1992.*
6. Although more and more MAB research activities were being carried out in biosphere reserves, the current levels and themes of research recorded for biosphere reserves

(from the survey) were extremely variable but there does not exist, as yet, a common template and basis for comparison.

There was therefore a growing need to promote a minimum co-ordinated research and/or monitoring programme for the international biosphere reserve network, for example using an international protocol and methodology for comparative studies. This need was becoming greater with the growing importance of cooperative research to understand better the phenomena associated with "global change" (climate change, loss of biological diversity, increasing pollution, large scale land-use changes, etc) and for which stations with long-term data sets were proving to be invaluable. In January 1990, the Secretariat convened a small task force to study the possibility of identifying a minimum set of measurements for comparative studies (site characterization of biosphere reserves) and of using biosphere reserves as a basis for long-term monitoring and research on global change. The Council requested that the results of this meeting be published and further consideration be given to the practical follow-up, for example in conjunction with UNEP (following the UNEP-GEMS inter-agency meeting planned for 3-7 December 1990), and/or through a special MAB task force to identify suitable partners.

7. There has been a considerable increase in the number of group training courses supported by UNESCO for specialists in protected area management and increasing use has been made of biosphere reserves for field training exercises.

The Council requested the Secretariat to consider that a synthesis of the different training courses be undertaken during 1991-92, as well as a compilation of the basic training "modules" that are used in order to make recommendations for tailoring future training courses specifically for biosphere reserve managers (and not just of protected areas in general) and also for the "community affairs

officers" of biosphere reserves who play a vital role in ensuring the consideration of the interests of the local communities.

8. There is a need to inform the international conservation community on the "success stories" of biosphere reserves around the world in order to make the concept better known as a viable, proven tool for the conservation of natural resources. The experience of 15-20 biosphere reserves identified as the "fully functioning examples" for demonstration purposes needs therefore to be documented and synthesized. Such a synthesis should be prepared for 1992 in time for UNCED.

The Council recommended taking advantage of the 4th World Congress on National Parks and

Protected Areas convened by IUCN in Caracas (Venezuela) on 10 to 21 February 1992. This Congress is a ten-year event and brings together a wide range of specialists from around the world. The Council recommended that a special workshop be organised to present case studies of the more successful biosphere reserves, grouped under different themes (for example application in different biomes and physiographic units, in situ conservation of biological diversity, contribution to sustainable development, coordination mechanisms, promoting cultural and natural values, etc). The main outputs of the workshop could include a publication presenting the case studies and a general presentation of the international biosphere reserve network for wide dissemination to decision makers during the 1992 events.

6. MODERN COMMUNICATION TECHNIQUES

The past decade has seen a tremendous development in information technologies from computer networks to telefax machines, video techniques, satellite data transmission, etc. The Council was presented with an "ideal" case scenario of how such modern communication technology could be put at the service of MAB research by the creation of a MAB information system. The objectives of such a system could be to (a) provide information and facilitate communication among those involved in MAB operational activities, (b) analyse and synthesize information produced by MAB research, and (c) maintain important environmental databases and research results generated by MAB research in a form that can be used by different audiences (e.g. scientists, decision-makers, general public), (d) provide a MAB communication network structure.

A MAB meta-database (a collection of smaller databases) might include such information as the location and description of field projects, lists of participants and project managers, details about biosphere reserves, literature and summarized re-

search results, information about and access to external databases on special topics.

Applying modern communication technology would be of particular value in facilitating information flow and capitalizing on the mass of data being generated within the biosphere reserve network. Data collected and analyzed in individual biosphere reserves could be aggregated within countries or biogeographic regions for data evaluation and processing, report generation, strategic modelling. Such regional nodes could then be linked to one or several international nodes for overall coordination of MAB activities, contacts to related programmes, preparation of general reports, and such like.

The Council heard that a small step toward developing computer communication links between biosphere reserves has already been taken in a number of countries. Furthermore MAB is co-operating with UNEP/GRID and the ITC (Netherlands) to provide the computing capacity and training necessary to establish Geographic Information Systems in a number of biosphere reserves.

7. TRAINING AND ENVIRONMENTAL AWARENESS

7.1 Training

The Council recalled the different types of training activities undertaken in biosphere reserves and as part of MAB research projects and noted with satisfaction the active participation of MAB National Committees in the implementation of the MAB Young Scientists Research Grant Awards. In the light of the impact this scheme has had since it was initiated in 1988, the Council encouraged MAB National Committees to launch national schemes, such as those inaugurated by China, Mexico, Soviet Union and Sweden, for granting research awards to their young scientists and promoting regional and international co-operation. The Council also requested MAB National Committees to make special contributions to the MAB Fund for providing research awards to young scientists and to organize regional or international training workshops in selected thematic areas (e.g. conservation of biological diversity, tropical forests and arid land development).

The Bureau of the Council reviewed 68 applications for consideration for the 1991 research grants and awarded 20 to the following young scientists:

- Mr Marone, Luis (Argentina). Seasonal migration of granivorous birds in the Nacunan Biosphere Reserve: effect of food level and winter temperature.
- Mr Parfenov, Pavel (Byelorussian SSR). Ecological role of aquatic vegetation in the evolution of temperate zone lakes of variable origins.
- Mr M'Borohoul, Jean-Benoit (Central African Republic). Study of factors influencing the sedentary character of people living in the buffer and transition zones of Basse-Lobaye Biosphere Reserve.
- Mr Liao, Jun-Guo (People's Republic of China). Growth of spruce and fir in relation to environmental changes in the Hungduan Mountain Area, China.
- Mr Heneidy, Selim (Egypt). An ecological study of grazing systems of Mairut, Egypt.
- Mr Mauchamp, André (France). Simulation studies on the dynamics of a plant formation in the arid lands of northern Mexico: "brousse tigrée".
- Mr Kim, Sung-Kyun (Republic of Korea). Human ecology in the controlled urban fringe: a case study for environmental planning and management of the southern green-belt area of Seoul.
- Ms Carbera, Laura Arriaga (Mexico). Gap dynamics and regeneration processes of tropical cloud forest in the El Cielo Biosphere Reserve.
- Mr Oli, Madan Kumar (Nepal). Wild Life Survey of the Upper Mustang Valley with special reference to the Snow Leopard (*Panthera uncia*) and Tibetan Wild Ass (*Equus hemionus kiang*).
- Ms Candish, Maree (New Zealand). Farm forests: their future in the East Coast Region of New Zealand.

Mr Kiapranis, Robert (Papua New Guinea). Plant species diversity enumeration.

Mr Gabien, Joseph (Papua New Guinea). Relationship between structure, soil nutrient content and nutrient supply in montane forests.

Ms Torres, Anna Maria S. (Philippines). Environmental perception study of Iraya Mangyans and other communities in the Puerto Galera Biosphere Reserve, Oriental Mindoro, Philippines.

Ms Cruz de Carvalho, Maria Adalgisa (Portugal). Evaluation of the extent of "humanization" of landscape in the Valley of Seda Raia River.

Mr Goudiaby, Assane (Senegal). Studies on the classified forests of Tendouk and relations between forests and riverine populations: suggestions for integrating development priorities of riverine populations.

Ms Gonzales Mancebo, Juana Maria (Spain). Studies on the stability of micro-habitats in the El Canal y Los Tiles Biosphere Reserve: bryophytes as indicators of environmental stability.

Mr Selvadurai, Dayanandan (Sri Lanka). Investigation of genetic variation between and within wild populations of selected species of *Shorea* (Dipterocarpaceae).

Mr Kabakibi, Mhd. Maher (Syria). Composition, structure and function of arthropod population of oak forests in Syria.

Ms Boukvareva, Elena (USSR). Creation of an information system for nature and biosphere reserves of USSR.

Mr Lausevic, Radoje (Yugoslavia). Long-term successional changes, production and seasonal dynamics of Lake Vlasinsko phytoplankton communities in relation to physico-chemical parameters.

The Bureau also recommended that the Secretariat, while inviting applications for future awards,

explicitly mention that international travel will not be supported as part of this grant scheme.

The Council noted the important role UNESCO's World Heritage Convention plays in training specialists in conservation and urged MAB National Committees to acquaint themselves fully with the implementation of the natural part of the World Heritage Convention and co-operate with relevant national agencies to launch training activities for promoting the conservation of natural heritage in biosphere reserves and World Heritage Sites. Furthermore, the Council also requested Member States to promote regional and international co-operation by launching Funds-in-Trust projects that include a significant training component.

In taking note of the recent developments in the international postgraduate training courses, the Council expressed the wish that the UNEP/UNESCO Course in Dresden, Germany, on Environmental Management in Developing Countries, be continued. The Council was informed of a new postgraduate institute launched in Egypt and its role in training postgraduate students as well as target groups from among the general public.

7.2 Environmental awareness

The Council recognized that environmental education is a major preoccupation and priority of UNESCO. It endorsed the decision taken by UNESCO to promote an intersectoral approach in this field, taking advantage of the experience gained by MAB, and its intention to propose the field of environmental information and education as a major contribution by UNESCO to UNCED. Further, the Council welcomed the joint UNESCO/UNEP International Strategy for Action in the Field of Environmental Education and Training for the 1990s, within the framework of which eight countries have been asked to develop a National Strategy and Action Plan for Environmental Education. The Council took note of and welcomed the intention of UNESCO to prepare a set

of multimedia environmental education materials around the theme of sustainable development. The Council reiterated recommendations made at previous sessions that MAB National Committees should take an active role in environmental education activities, promoting an intersectoral approach. It is not enough, in today's world, to promote only environmental awareness; rather, MAB should be involved in environmental education activities that build up positive attitudes, lead to changes in behaviour and teach the specialized skills needed for conservation.

The Council agreed that environmental education should reach all levels of the population, from young children to adults and from the uneducated to decision-makers and scientists. Scientific research can only be fine-focused if it is based on a productive dialogue between all actors concerned (natural and social scientists, general public, decision-makers) on the basis of objective information presented in a way intelligible to all. To achieve this, all available media should be employed ranging from poster series to publications, videos, films, and radio programmes.

The Council emphasized the potential of biosphere reserves to play an important role both in educating local populations about environmental concepts and in developing a bottom-up approach to environmental education by which researchers and planners can benefit from the traditional knowledge of local people.

One delegate indicated that he had hoped that the Council might have benefited from the recent experience gained within the Education Sector in respect to environmental education. Close co-operation between the environmental sciences programmes and the Education Sector was particularly important within the perspective of the recently launched intersectoral programme on environmental education and information led by the Co-ordinator for the Environment. A delegate proposed that a committee be set up to commission authors to write manuals and extension publications on specific topics of environmental interest.

Council delegates gave examples of actions being undertaken in the field of environ-

mental education. These included the hosting by Canada of the International Conference on Environmental Education in Toronto in October 1992, to bring together educators from around the world to discuss the national strategies developed within the framework of the UNESCO/UNEP International Environmental Education Programme and, in particular, to focus on the messages from UNCED. Other examples included: the positive experience in organizing environmental education courses for religious leaders in Egypt; a joint initiative by scientists and indigenous people of the Peruvian Amazon to create a tropical forest "hero", a local cartoon character to inspire children to defend the environment; the preparation in Spain of videos, TV films and children's publications, as well as a book for teachers analyzing problems in the world environment and reporting some of the environmental education efforts being made.

The Council was pleased to note the production by Sono Multivision for TV3-TV Catalunya with sponsorship by the MAB National Committee of Spain, of a new television series "Biosfera", comprising 13 one-hour programmes describing world ecosystems and the relationships between people and their environment. Each programme will be filmed in one or more biosphere reserves, representative of different ecosystems.

The Council also noted with a certain satisfaction that MAB National Committees continue to be active in producing environmental education materials as illustrated by the number of exhibits presented outside the Council meeting room. In addition to the Biosfera series mentioned above, these included posters on the biosphere reserves of Cevennes (France) and Montseny (Spain), a case study on the Méjan area of the Cevennes Biosphere reserve, an audio-visual show on the Krokonoše National Park in Czechoslovakia, a video on the Bañados del Este Biosphere Reserve in Uruguay, and a demonstration of a directory of environmental scientists for Latin America prepared by Dr. Jorge Rabinovich of Buenos Aires, Argentina in collaboration with UNESCO-ROSTLAC.

8. CO-OPERATION WITH INTERNATIONAL GOVERNMENTAL AND NON-GOVERNMENTAL ORGANIZATIONS AND PROGRAMMES, AND OTHER SCIENTIFIC PROGRAMMES OF UNESCO

At several points in the Council's agenda, representatives of collaborating international organizations and programmes enriched the Council debate. Edited summaries of these various interventions are as follows:

UNEP

The representative of the United Nations Environment Programme (UNEP) provided an overview on the co-operation between his organization and MAB. In the past and present, joint activities have focused on environmental training, conservation of biological diversity - notably in biosphere reserves, environmental monitoring and management of tropical forest ecosystems. UNEP is inviting MAB to increase collaboration in such fields as the management of ecotones, urban ecology, combating desertification, and the foundation of a World Environment Academy. Jointly assessing the biosphere reserve network and establishing an international legal instrument for the conservation of biological diversity could be further areas of collaboration.

FAO

Recalling that FAO's relationship with MAB dates back to its inception in 1971, the representative of the Food and Agriculture Organization of the United Nations (FAO) welcomed the convergence of both the UN specialized agencies on the common theme "sustainable development". The efforts of UNESCO, FAO and other organizations to develop an international legal instrument for the conservation and use of biological diversity will be a challenging undertaking. Close

consultations are needed to ensure a legal instrument that is sufficiently focused to be effective, while also being sufficiently broad to complement other mechanisms that are already in place. Co-operation between the two UN organizations exists primarily in areas such as dryland management and desertification control in Africa, tropical forests in Asia, protected area management in Latin America, and the global application of technologies such as biological nitrogen fixation. FAO encourages MAB to give priority to research programmes on agricultural ecosystems and environmental education, also in view of UNCED.

IUBS

The representative of the International Union of Biological Sciences (IUBS) recalled the "Decade of the Tropics Programme", which was launched by IUBS in 1982 and co-sponsored by MAB. Implemented in co-operation with the International Biosciences Network (IBN) and supported by the Commission of the European Communities, the Rockefeller Foundation and the ODA-UK, the Decade programme is concerned with key biological and ecological questions on tropical environments, such as the effects of disturbance, the resilience of tropical ecosystems, the role of organisms in soil fertility, and the sustainability of traditional mountain agriculture. Four areas were identified as particularly relevant and research programmes are as follows: (1) Tropical Soil Biology and Fertility (TSBF); (2) Response of Savannas to Stress and Disturbance (RSSD); (3) Comparative Studies in Tropical Mountain Ecosystems (TME); and (4) Studies in Tropical Human Populations. Several workshops and

training courses have already been organized and a large number of reports and publications have resulted from these studies.

IUCN

The representative of the International Union for Conservation of Nature and Natural Resources (IUCN) strongly supported the work of UNESCO in the field of biodiversity. IUCN and UNESCO have a long record of collaboration, especially in the establishment and management of biosphere reserves, and the natural World Heritage sites. IUCN expects to expand even further its collaboration with UNESCO in the coming years, particularly through collaborating in the preparation of the 1992 World Congress on National Parks and Protected Areas, which will have a special workshop on biosphere reserves as well as featuring biosphere reserves in many of the other workshops. IUCN also looks forward to participating in the work of the Advisory Committee on Biosphere Reserves as recommended by the Council. This Committee is essential if biosphere reserves are to play the important role that will be required if the challenges of the 1990s are to be met.

ISSC

Since the 1989 UNESCO General-Conference, the International Social Science Council is now on the list of non-governmental organizations co-operating with MAB. The representative of ISSC presented an overview of the nature and features of the newly developed programme on "Human Dimensions of Global Environmental Change" (HDGEC) which is considered as a complementary and parallel programme to ICSU's International Geosphere Biosphere Programme (IGBP) addressing interactions between the physical environment and human activities. Within the framework of ISSC's new programme, co-operation between ISSC and MAB is sought in fields relating to land use; food and nutrition in the tropics;

concepts, models and data for HDGEC; methodological aspects of global modelling - micro-macro links; social science and the future of Amazonia; and population and energy.

SCOPE

In her intervention, the representative of the Scientific Committee on Problems of the Environment (SCOPE) mentioned the complementary collaborative activities between SCOPE and MAB, such as in the fields of studies of dynamic changes in terrestrial ecosystems, modelling, environmental perception, land transformation and ecotone studies. SCOPE is inviting MAB to increase co-operation further, e.g. in projects seeking to incorporate scientific information into strategic level development planning to promote environmentally sound development, and presenting such information in user-friendly ways.

IHP

UNESCO's International Hydrological Programme (IHP) is MAB's twin programme as it was termed by IHP's Secretary. Co-operation between the two programmes exists primarily in the field of studies on ecotones and large rivers in the temperate climate areas. IHP, as stated during its recent Bureau and Council sessions, would very much welcome increased collaboration between the two programmes, not only at the secretariat level, but also between the IHP and MAB National Committees. This collaboration could include hydro-ecological and hydro-biological aspects of hydrology. In the period 1990 to 1995, IHP is focusing on environmental investigations of water resources in large flatlands, the inclusion of social aspects in the integrated evaluation of water resources, hydro-ecological modelling and bio-monitoring, the environmental and socio-economic consequences of the development of water projects, and the comprehensive study of large lakes. MAB's input to these studies would be highly desirable.

9. THE SULTAN QABOOS PRIZE FOR ENVIRONMENTAL PRESERVATION

The Council noted that in June 1989, the Director-General received from His Majesty Sultan Qaboos Bin Said, Sultan of Oman, an offer of a biennial environment preservation prize to be financed from the interest accruing from a donation of \$250,000 to be invested by UNESCO. This offer was presented to the Executive Board at its session in September/November 1989. The Executive Board decided to authorize the Director-General to accept this prize, and approved a set of statutes and the financial regulations.

The Council in particular considered paragraph 1 of the Statutes, which specifically refers to environmental and natural resources research as well as the establishment and management of protected areas such as biosphere reserves and natural World Heritage sites. Furthermore, the MAB Bureau is named as being responsible for setting the value of the prize and the selection of the prize-winners. The Council recalled that its Bureau, at its meeting on 6-8 February 1990, had taken note of this prize and had requested the Sec-

retariat to convey its thanks to Sultan Qaboos of Oman. The Bureau was honoured that the Executive Board had endowed it with the responsibility of acting as jury to select the prize winners. The MAB Secretariat had subsequently conveyed the Bureau's thanks to the Permanent Delegation of the Sultanate of Oman. The Bureau requested the Secretariat to undertake a number of tasks with the view of inviting nominations for the prize to be awarded in 1991. The Council noted however, that at the time of its present session, the Secretariat had not yet been notified of the transfer of the funds.

Given the fact that the prize was intended to be granted from the interest accruing over a two year period and that UNESCO was still awaiting the transfer of the funds, the Council realized that the prize could only be awarded for the first time at the General Conference in 1993. In consequence, the Council requested that this matter be re-examined by the Bureau at its next meeting in March 1991.

10. CONCLUSIONS AND GENERAL RECOMMENDATIONS*

10.1. General considerations

The International Coordinating Council (ICC) for the Programme on Man and the Biosphere (MAB) met for its eleventh session at UNESCO House in Paris from 12-16 November 1990: two decades after the launching of MAB and eighteen months before the United Conference on Environment and Development (UNCED) to be held in June 1992. As such, the Council felt that it was timely to consider the extent to which the present framework and activities of MAB may contribute to addressing the environmental, natural resource and economic development issues of the 1990s and thereafter.

The Council felt that the so-called MAB approach, entailing an integrated cross-sectoral philosophy at the interface of people and environment, was becoming even more relevant in addressing the complex problems of the 1990s. The Council recognized that although many obstacles had been encountered in putting such an approach into practice, MAB is well positioned to respond to emerging challenges of sustainable development at local, regional and global levels, especially in developing countries. Sufficient examples exist to demonstrate that the approach can be effective in generating a unique set of scientific results of practical value, training and demonstrations to make an important contribution to these major problems. In order for UNESCO-MAB to contribute significantly to the issues of the 1990s, the Council recognized the need to consolidate the strengths of MAB and to redress perceived shortcomings. The time has come to move swiftly to

make more effective use of scarce resources, and to concentrate MAB efforts on a selected number of priority topics and tasks.

10.2. General recommendations

Taking into consideration the above general context, and recognizing that MAB generates funds for research, information and implementation within UNESCO equal to six times the UNESCO regular budgetary allowance to MAB, the Council adopted the following general recommendations and considerations, (A) for attention by the MAB National Committees and collaborating institutions at the national level, (B) for inclusion in the report of the ICC to the twenty-sixth session of the UNESCO General Conference, and (C) for consideration by the Director-General of UNESCO.

A. Recommendations to MAB National Committees, National Commissions for UNESCO and other national institutions collaborating with MAB

The International Co-ordinating Council for the Programme on Man and the Biosphere, meeting at its eleventh session at UNESCO House in Paris from 12 to 16 November 1990,

Aware that the early 1990s represent for MAB a period of transition between sectoral and problem-focused studies and the need for

* Including revisions of the MAB Council during its final session on the afternoon of 16 November 1990.

activities that will address comprehensive and integrated issues facing humankind;

Considering the uneven participation of some MAB National Committees in the development of MAB and the existence of disparities in their functioning, their intervention and their capacity of action, due to lack of resources, especially in developing countries;

Considering also that the opportunities that MAB presents for identifying the problems, assembling knowledge and developing practical courses of action related to human activities, the environment and the biosphere are not known to or fully used by the international scientific community;

Considering the need to strengthen the programmes of MAB that produce results relevant to national and international policies;

Recommends that MAB National Committees, National Commissions for UNESCO and the other institutions of Member States responsible for relations with UNESCO

- (a) enhance the effectiveness and relevance of MAB activities and programmes by giving special attention to the incorporation and integration of the perspectives of various actors influencing the course of economic development, particularly the policy community;
- (b) take steps, appropriate to each country, that will support and reinforce the participation of researchers from national institutions in existing research projects within the framework of MAB;
- (c) take initiatives for developing regional co-operation leading to the establishment of regional priorities, the implementation of concerted projects and the adjustment of MAB activities, in collaboration with the Regional Offices of UNESCO as well as the MAB

Secretariat in Paris;

- (d) increase the visibility of past accomplishments and of emerging activities within MAB by the preparation of syntheses and other contributions that might be brought to the attention of the twenty-sixth General Conference of UNESCO in October-November 1991, to policy-making bodies and to the institutions of MAB, as well as those taking part in the preparation of UNCED;
- (e) increase the priority given to valorization of findings of MAB and the distribution and implementation of its recommendations for action by active transfer of relevant research results to decision-makers and by preparing appropriate educational materials;
- (f) promote the active participation of scientists participating in MAB in the preparation and convening of UNCED in such ways as by contributing to the preparation of national and regional reports and by being part of their national delegations.

B. Elements for the Report of the ICC to the Twenty-Sixth Session of the UNESCO General Conference

The International Co-ordinating Council for the Programme on Man and the Biosphere, meeting at its eleventh session at UNESCO House in Paris from 12 to 16 November 1990,

Having reviewed Draft Resolution 25C/DR.96 presented to Commission III of the twenty fifth session of the UNESCO General Conference, and the Director-General's written response thereon;

Concurring with the underlying concerns that had given rise to the draft resolution on the need for scientific programmes such as MAB to continue to evolve and respond to new challenges and opportunities of sustainable development, by harmonizing

response actions to changing problems, and by addressing effectively the need to remove obstacles in putting plans into practice, etc;

Expressing, on the one hand, general agreement with the sentiment that UNESCO's environmental programmes and projects should not be open-ended, but should be of a given duration;

Underlining, on the other hand, that programmes such as MAB are long-term by their very nature - in terms of both ecological processes and complexity of systems, and that considerable effort and lead-time are entailed in establishing interdisciplinary goal-oriented projects with multiple components including research, training, demonstration, information and synthesis;

Agrees in principle that MAB should review by 1995 at the latest (in reference to the duration of the Third Medium Term Plan of UNESCO: 1990-1995) its current programme to identify those research activities that no longer respond to contemporary priorities;

Notes that the process of transition towards a new generation of activities should be ensured by: undertaking a specific operation to design a new programme of policy relevant work; building on the strengths and achievements over twenty years of MAB; capitalizing on its comparative advantages; addressing the obstacles and constraints that have been encountered in putting past plans into practice; and by narrowing the gap between aspiration and performance;

Reiterating the importance of undertaking substantive syntheses of the results of various major activities of MAB, as a basis for subsequent evaluation of the effectiveness and impact of actions undertaken within the framework of the programme;

Taking into account the desirability of shifting the focus of MAB from a purely scientific perspective on Man and the Biosphere to sustainable development, through making MAB's work more policy-relevant and through synthesizing information to provide insights for policy;

Reports that it has decided

- (a) to initiate a new assessment of accomplishments and shortcomings, as a springboard for renewal of the programme and as a contribution to the planning and design of future interdisciplinary and policy-relevant work on environment and development issues within the framework of sustainable development;
- (b) to commission an overview of two decades (1971-90) of activities within MAB;
- (c) to set up two advisory groups, whose terms of reference will be submitted to the MAB Bureau at its meeting in March 1991 - one dealing with biosphere reserves, the other with scientific programme matters - to provide counsel to the MAB Bureau and to chart options for the future development of the programme;

Invites MAB National Committees, the scientific community and international organizations to participate actively in the process of assessment and evaluation of MAB and of identification of future directions of work.

C. Recommendations to the Director-General of UNESCO

The International Co-ordinating Council for the Programme on Man and the Biosphere, meeting at its eleventh session at UNESCO House in Paris from 12 to 16 November 1990.

Having examined recent progress and present status of the MAB Programme;

Recognizing the singular importance of the UN Conference on Environment and Development (UNCED) in shaping the community of nations' response to environmental issues in the 1990s, and the need to pay special attention to the needs of developing countries;

Considers that the contribution of MAB to the present wide-ranging UNCED process of taking stock and assessment would be facilitated by a concentration of activities and resources within MAB itself, a stronger articulation between MAB and other programmes and bodies and the development of cross-cutting themes such as biological diversity and environmental education.

Concentration of the programme and its resources:

The Council:

Recognizing the need to consolidate the strengths of MAB, to redress perceived shortcomings, and to make more effective use of scarce resources;

Emphasizing the desirability of UNESCO's traditional function of mobilizing resources for long-term ecological studies, for goal-oriented research "upstream" of operational development, and for building up institutional capacities for integrated approaches to land use and resource management problems;

Suggests that concrete measures be taken as from 1991 to concentrate MAB efforts on a selected number of priority topics and tasks;

Recommends that priority tasks for 1991-93 in respect to the allocation of UNESCO resources (human and financial) and to programme planning should concern:

- (a) consolidation and reinforcement of the international network of biosphere reserves, incorporating within their

programmes long-term ecological research and monitoring of global change, conservation of biological diversity and exploring approaches to sustainable development;

- (b) consolidation and reinforcement of the different research networks within MAB at regional and international levels, aiming at the support of sustainable development. These networks in varying degrees should be entrusted to co-operative and co-management arrangements of different kinds;
- (c) contributing to improving the communication of the results of the scientific work to non-specialist user groups, with particular emphasis on decision-makers.

Considers that attention to these priorities will enhance opportunities for UNESCO-MAB to contribute distinctively and effectively to the process leading up to UNCED.

Co-operation with other bodies and programmes

The Council:

Recognizing that the world's environmental problems are complex and cross-connected with other issues and that addressing these issues requires the input of a wide range of biophysical and human sciences;

Recognizing also that efforts to promote the priority areas defined above cannot be undertaken in isolation;

Emphasizes the need to seek articulations between different scientific programmes and their respective constituencies, and to consolidate and reinforce mutually beneficial and supportive links between MAB and many other bodies and programmes - both within UNESCO and outside;

Recommends that collaboration and joint activities be developed and reinforced between MAB and:

- (a) the other international environmental programmes and activities of UNESCO such as those dealing with the oceans, coastal areas, water resources, earth sciences, social sciences, environmental education;
- (b) non-governmental scientific bodies such as ICSU (SCOPE, IUBS, IGBP etc), IUCN, ISSC, and others;
- (c) with UNESCO's sister institutions within the United Nations family;
- (d) with the whole process of discussion and negotiation associated with UNCED;
- (e) with other intergovernmental bodies having programmes in related fields.

Consolidation of the International Network of Biosphere Reserves

The Council:

Considering that the biosphere reserve concept has become increasingly recognized as being one of the most distinctive contributions to efforts world-wide to

promote participatory approaches to the conservation and long-term use of biological diversity;

Emphasizing the importance of biosphere reserves as sites for long-term research and monitoring on environmental change, for the conservation of biological diversity and for exploring and demonstrating approaches to sustainable development;

Stressing that the international network of biosphere reserves, based firmly on national initiatives and national sovereignty concerning the use of resources, constitutes the only framework of protected natural areas at the intergovernmental level that seeks to harness conservation with development, research with demonstration, and education with training;

Considering that the status of biosphere reserves in each country and the functioning of and support to the international network would be strengthened by providing the network with an enhanced status;

Requests the Director-General to set up a working group to examine the status of the international network of biosphere reserves.

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ANNEX II

Abridged version of the Report by Mr Bernd von Droste Secretary of the MAB Council

First of all, let me welcome you all to this 11th session of the International Co-ordinating Council of the Man and the Biosphere Programme (MAB). I am especially pleased to see more than twenty delegates from the twenty-nine Member States currently forming the MAB Council, and nearly thirty representatives from other National Committees, and numerous observers from international organizations, including UNEP, FAO, ICSU, ISSC, IUCN, IUBS and SCOPE.

I should like to thank the Chairman of the outgoing Council, Mr. Li Wenhua, as well as its former Vice-Presidents, Messrs. Halffter, Long, Posso and Sokolov, and its Rapporteur, Mr. Ayyad, for their outstanding contribution to MAB during the past two years. This included the adoption of procedures and criteria for the inclusion of new sites in the biosphere reserves network and for the recognition of exemplary MAB research through international pilot projects. I also wish to mention the launching of the MAB Young Scientists Research Grant Awards and of the MAB Book and Digest series. Let me also congratulate the new members of the MAB Bureau on their election. We all look forward to fruitful collaboration with them in the future.

Main tasks of the 11th session

As the Director-General has already said, this is a very important session of the Council, for at least four reasons:

First, this session and 1991 provide the occasion to review and evaluate the first two decades of MAB. You will remember that the 7th session of the MAB Council, which was held in 1981 together with the "Ecology in Action" Scientific Conference, reviewed and evaluated the first decade of MAB.

Second, there will be considerable activity world-wide for the United Nations Conference on Environment and Development to be held in 1992 in Brazil. The next two-year period may well shape the agenda of international co-operation on resource management for the decade and beyond UNESCO, in

general, and MAB in particular, should play an important role in shaping that process. The opportunity for an assessment of MAB in conjunction with a continued forward planning exercise beyond UNESCO's Third Medium-Term Plan, which terminates in 1995, should thus be seized.

Third, this Council and its Bureau may wish to formulate recommendations for the next UNESCO Biennial Plan (1992-1993) to be endorsed by the 26th General Conference next year.

Fourth, with help of its newly elected Bureau, the Council has to make a number of decisions during this session.

In order to do all of this, we have organized this Council to provide a clear picture of what MAB is doing. I hope that this will help in the necessary appraisal of the programme, including both its shortcomings and achievements. We are particularly interested in underlining the reasons for progress – or lack of it – and in your suggestions for improvements and change.

UNESCO's 25th General Conference

I will now try to summarize the present state of MAB as the result of the 25th session of the UNESCO General Conference, which approved UNESCO's Medium-Term Plan for 1990-95. In general terms, this Plan intends to mobilize all sectors of UNESCO – Education, Science, Social Sciences, Culture and Communication – to achieve jointly through a synergistic effort three major objectives: fostering development in the spirit of solidarity, contributing towards constructing peace, and working to reconcile humankind with nature.

In order to achieve this synergy through intersectoral co-operation in the field of environment, the Director-General has just appointed three former MAB colleagues to form a special co-ordination unit for the Environment. May I warmly welcome Francesco di Castri to our session as the newly-appointed Co-ordinator for the Environment, Gisbert Glaser as his Deputy Co-ordinator, and Jeanne

Damlamian as Environmental Co-ordination Officer. We wish them every success in their important work for UNESCO.

The 25th General Conference approved the programme and budget for 1990-91 within the overall six-year Medium-Term Plan. Under its seven Major Programme Areas, Major Programme Area II deals with Science, entitled "Science for Progress and Environment". MAB, IHP, IGCP and IOC fall under Programme II.2 "Environment and Natural Resources Management". MAB itself is organized in six programme areas, for which the General Conference approved a total of US \$2.3 million for 1990-91, as follows:

1. *In situ* conservation

This area is UNESCO's contribution to one of the most important challenges of the 1990s, namely to conserve humanity's natural heritage. For 1990-91, the main thrust consists in the implementation of the Action Plan for Biosphere Reserves and of the Natural Heritage part of UNESCO's World Heritage Convention. A scientific issue now of the first order of importance is biological diversity.

Although not directly addressed so far by MAB, this could become an important co-operative programme area with SCOPE, IUBS and IUCN. It may eventually lead to the establishment of a special core project within ICSU's Global Change Programme. It should be mentioned that important inputs are already being made to IGBP, notably by developing long-term ecological research and monitoring in biosphere reserves. At present 29% of MAB's budget is allocated to wide-ranging activities under "*in situ* conservation".

2. Integrated projects for sustainable development

We support under this programme MAB field projects in different climatic zones, in particular in tropical, arid and Mediterranean climatic regions, receiving 25% of MAB's budget. Fortunately, considerable extrabudgetary funds have become available under Funds-in-trust agreements and UNDP plans to reinforce this programme area.

3. Coping with change in human/environment interactions

This programme area focuses on the development of innovative comparative research involving non-govern-

mental partners or other suitable ways to decentralize implementation.

This part of MAB, which also includes the study of urban systems as ecological entities, receives only 18% of the total budget. It survives only thanks to very committed and well-established partners.

4. Human Resources Development

This programme area includes the MAB Young Scientists Research Grant Awards, *in situ* training courses in less developed countries and other training in developed countries. 9% of the total Regular Programme budget is devoted to this area. Additional extrabudgetary funds are available, particularly for training of conservation specialists and for human resources development in the tropics.

5. Dissemination of Information

Close to 9% of the Regular Programme budget is allocated to documentation, information gathering, synthesis work, publication and dissemination of research results. Limited funding is a serious constraint for the necessary synthesis work in MAB and wide dissemination of research results, particularly for use by decision-makers.

6. Concerted action at national, regional and international levels

Close to 10% of the budget – or \$230,000 for two years – is allocated to co-ordination and regional co-operation in MAB, which includes support to Member States in strengthening MAB National Committees, regional MAB meetings, convening of the MAB Bureau and of the MAB-ICC as well as the co-ordination with other international organizations.

Overall Financial Resources

Between 1987 and 1991 there has been a relative increase in the overall funding of MAB from \$2.4 million per year in 1987 to \$6.2 million per year in 1990. While there has been a substantial decrease of the share of UNESCO-provided funds from 50% in 1987 to 14% in 1990, this has been more than made up for by a steep increase in Funds-in-Trust made available to MAB (\$6.9 million for the biennium 1990-91). UNDP funding has decreased slightly but still stands at about \$1.8 million for 1990-91; UNEP also provides MAB with a continuing, though relatively low-level, support.

For 1990-91, \$11.3 million are on hand so far, out of which almost 61% are Funds-in-Trust, 16% come from UNDP and 5% from UNEP. The share of the UNESCO Regular Programme for this biennium is about 18%, which means that each dollar from UNESCO is matched by more than five dollars from extrabudgetary resources.

It should be noted that these figures are not the same as the budget for the Division of Ecological Sciences as a whole, which totals US \$ 14.2 million for 1990-91, of which \$11.3 million are funds for MAB from different sources, \$2.5 million World Heritage funds, \$260,500 for *Nature & Resources*, and \$200,000 from the Participation Programme.

MAB's 15 extrabudgetary-funded projects amount to \$16 million for the entire funding period. Half of these projects are regional and are particularly important because they promote regional networking. This is notably the case with the FRG/BMZ-funded projects on tropical forests, which strengthen MAB research and training activities in Africa, Asia and Latin America.

The MAB Sahel Project is also supported by the FRG/BMZ with nine Sahelian countries as beneficiaries. Switzerland supports ICIMOD, UNEP supports the Dresden Ecosystem Management Course, UNDP supports the Mediterranean Environmental Management Centre in Malta, and Funds-in-trust provided by Japan support MAB co-operation in South-East Asia.

A very important contribution to environmental research, management and training is made by the Federal Ministry of Research and Technology of Germany under the Co-operative Ecological Research Project in China.

I also wish to express our gratitude to Norway for supporting the Turkana Resources Evaluation and Monitoring Unit (TREMUR) in Kenya, to the BMZ/-Germany for the integrated project on arid lands, IPAL-Lesotho; to the UNDP and the World Bank for the establishment of biosphere reserves in Madagascar; to UNDP for research at Mt. Nimba in Guinea, Savanna research in the Comoé Biosphere Reserve in Côte d'Ivoire, for funding the Mayombe Project in the Congo and the Tassili N'Ajjer Project in the Central Sahara of Algeria. A number of other projects are also in the pipeline.

In conclusion, the funding situation has considerably improved for MAB activities in the tropics, arid lands, and in selected biosphere reserves. There is, however, a great preoccupation on how to fund future MAB Scientific Advisory Committees, comparative studies and publications. Among MAB comparative studies, the only area that enjoys substantial extrabudgetary support is the

TSBF carried out in partnership with IUBS, for which the Rockefeller Foundation has provided major funding.

Staff Resources

Most professionals working in MAB are scientists with a Ph.D from a variety of disciplinary backgrounds including entomology, anthropology, economics, forestry, computer sciences, geography and rangeland management. Staff changes in 1990 included the departure of Walter Lusigi to join the Africa Regional Office of the World Bank. On the other hand, Vladimir Savchenko, former Chairman of MAB Byelorussia and Han Qunli, formerly at the Chinese Academy of Sciences, joined us.

Overall there has been a slight improvement in the staff situation in comparison to 1988. This is due to the provision of eight Associate Experts by Germany, the Netherlands, Spain and Sweden and eight field project staff supported under extrabudgetary funds. National counterparts in extra-budgetary-funded field projects are in the order of 120 specialists. I also wish to express my deep gratitude to France for staff secondment to reinforce MAB work at headquarters and to the United Kingdom for providing a top scientist to manage the TSBF programme. Let me take this occasion to encourage countries and MAB National Committees to follow these examples of supporting MAB.

In spite of these efforts, however, the staff situation remains very critical, particularly at Regional Offices. MAB has no regional officers for the Arab, Latin American and West Central Asian Regions. At headquarters, we urgently require a MAB Communications Officer, a specialist for handling operational projects, a top landscape ecologist, a tropical ecology specialist and an expert in conservation biology.

MAB National Committees

According to its Statutes, MAB is a nationally-based programme of research with National Committees providing the mechanisms for initiating and co-ordinating national activities. As of today, out of the 161 UNESCO Member States, 110 have established MAB National Committees; furthermore, there are MAB National Committees in the U.K. and the U.S.A.

The most notable absence of MAB National Committees is in Africa, particularly in southern Africa, the Arabian peninsula, Central Asia and the Pacific. The number of National Committees has practically remained unchanged over the past five

years. Their activities are of very different nature and intensity. One way to identify those countries that have active National Committees and MAB projects is to list their publications. Twelve countries issue MAB newsletters and twenty-five have produced more than five publications during 1988-1990.

Independent of the national MAB structure, an increasing number of scientists, scientific institutions and NGOs are contributing to MAB. Increasingly, since the mid 1980s, MAB is no longer confined to intergovernmental relations between nation states. The programme has evolved towards a hybrid involving intergovernmental and non-governmental, official and private sectors, reflecting a change in the organization of the environmental sciences community.

The best examples for a truly functioning national MAB programme are found in countries that have made the MAB structure a broad platform for intersectoral and interdisciplinary co-operation involving key individual scientists from social and natural sciences, private and public research institutions, government agencies and NGOs, the media and educators.

Such an ideal MAB structure exists only in a handful of cases. Many MAB National Committees are not at work, are underfunded, do not meet regularly or are not sufficiently linked to the scientific community. Nevertheless, practically all countries periodically participate in one way or another in the programme, sometimes through NGOs belonging to the ICSU family, ISSC or IUCN. Furthermore, an increasing number of direct links with scientific institutions of excellence and international scientists have been established.

Therefore, among the most significant features of MAB today are its multiple channels for national and regional implementation, which help to overcome limitations of a sometimes inadequate governmental structure. Fortunately, there is a core of MAB National Committees that are well-organized and act as a major driving force for programme innovation.

MAB Networks

MAB today basically consists of thirteen international research networks, which are at various stages of development and relate to different regions of the world. Some of them are co-ordinated by scientific institutions outside of UNESCO (so-called decentralized networks), given the scarcity of staff in the MAB Secretariat and budgetary limitations. There is a considerable difference in the organization and implementation of the individual networks. (Please see the main text for more details.)

Human Resources Development

Three different types of training activities took place during the past biennium. The most innovative has been the launching of the MAB Young Scientists Research Grant Awards last year. Thirty grants have been awarded for 1989/1990 and, subject to the decisions of this Council session, another 15 to 20 awards will be allocated for 1991.

Considerable emphasis was also put on training of conservation specialists, especially in the tropics. Twenty-five *in situ* training courses were held including joint courses with the Smithsonian Institution on biological resources inventory and taxonomy in Guatemala, Ecuador, Peru and Bolivia.

Most training activities, however, fell under the broad chapter of training in ecology and environmental sciences, including the training of specialists in pastoral management of the Sahel (FAPIS), and of biosphere reserve personnel in the application of geographical information systems, an activity conducted jointly with ITC. Support was also given to fourteen postgraduate training courses at European institutions, attended by 230 specialists from developing countries.

In all, more than fifty training courses were organized during the last two years under the auspices of MAB. The professional training of 1,197 specialists was promoted at the cost of about \$1 million to MAB, mostly covered by extrabudgetary funds.

Communication activities

In 1989, the MAB Book series began to be published by the Parthenon Publishing Group in the United Kingdom. The first five volumes are now available. Also in 1989, desk-top publishing became operational within the MAB Secretariat making possible the launching of the MAB Digest series. Six Digests have been produced so far, including *Human investment and resource use* and *Debt-for-nature exchanges and biosphere reserves*. Information on MAB was published in semi-popular forms in *Man Belongs to the Earth* in Chinese, English, French, German, Spanish and Russian. The Biennial Report on MAB was also widely received. Four issues of *InfoMAB* were published in 1989-90, totalling 176 pages. 1990 also marked the re-launching of UNESCO's long-standing quarterly review *Nature & Resources*. The first revamped issue was devoted to Remote Sensing for Biosphere Studies, based on a joint UNEP/UNESCO-MAB Symposium held in Moscow in 1989.

Among the 35 MAB publications that we published in 1989/90, I wish to mention in particular *Food and Nutrition in the African Rainforest*. Many other

publications have been issued by MAB National Committees. We received more than 300 MAB books and reports during 1989/1990. I am also pleased to inform you of our co-operation with TV-3 Catalonia aiming at the production of 13 films on biosphere reserves.

Looking ahead

I have tried to give an overall picture of MAB today and would now like to come back to the very substance of the programme - its thirteen networks. A number of steps need to be taken to upgrade their quality, to improve their relevance to decision-making and to increase their focus. Only a few networks now have a scientific steering committee, built-in evaluation procedures or a sunset clause. Well-organized networks such as the TSBF, Ecotones and Sahelian networks could serve as models.

All four dimensions of MAB should be incorporated, as much as possible, in MAB research. It is of particular importance that appropriate consideration be given to economic/ecological linkages which, up to now, have hardly been studied in MAB. Another critique that can be made is that MAB has not been sufficiently upstream and policy-oriented, but rather confined to the scientific community. Only in exceptional cases has the programme contributed to institution-building such with ICIMOD in Nepal, KALRES in Kenya, ICALPE in France and CIET in Venezuela. It seems to me that more attention should be paid to strengthening existing research institutions and helping them to build up international linkages and become intersectoral in scope.

A shortcoming of MAB in the past has been its open-endedness and lack of synthesis work. I propose that at least two, if not more, networks should be closed down by 1992 and proceed to synthesis work. Among the networks I would consider ending are the TSBF and RSSD. New networks will be proposed to this Council concerning, for example, high mountain studies, biological diversity, as well as a possible one on the effects of the Chernobyl accident. The launching of new networks in MAB should, in my opinion, be conditional upon several factors: sufficient planning leading to the formulation of hypotheses, preparation of methodological guide-lines, the establishment of a highly qualified steering committee and evaluation procedure, availability of adequate funding and the identification of a committed international partner for co-management.

Co-management has already been achieved for a number of networks either through partnership with ICSU/IUBS (e.g. TSBF, RSSD), or with key scientists/scientific institutions as is the case

with the MAB Northern Science Network, ecotone studies, land use studies and temperate forest investigations. I would like to suggest that we also identify a suitable partner for MAB urban systems research, such as INTECOL. Island research could increasingly be co-ordinated by INSULA and high mountain research by ICALPE.

Effective partnership arrangements would liberate resources within the MAB secretariat for the necessary greater concentration on developing the potential of the international biosphere reserve network for research, monitoring, *in situ* conservation, buffer zone development, environmental education and training. In my view, a desirable policy would be to work towards an increased convergence of all MAB activities to strengthen the international biosphere reserve system. As part of such a policy this Council may wish to set up a scientific advisory committee for biosphere reserves.

As a future direction within MAB, I would also like to recommend increased regionalization of the programme without, of course, losing its world-wide context. For this I would just like to give two examples. The first of these is EuroMAB in which five MAB networks are particularly active. A major objective of the Third EuroMAB Conference, to be held in Strasbourg, France, in September 1991, is to formulate a coherent all-European MAB programme as a partnership enterprise with the European Community, the Council of Europe and other European institutions.

Second, MAB may receive a new dynamism through co-operation with UNAMAZ, the Association of Amazonian universities and research institutions, which brings together eight countries, and with which MAB is now entering into much closer collaboration. I would like to propose the launching of a MAB Pro-Amazonia programme for South/South scientific co-operation around the central theme of "Ecologically, socially and economically sustainable resource use in the humid tropics".

In conclusion, it would seem that MAB's short-term target should be mobilization to produce a significant input to the 1992 United Nations Conference on Environment and Development. For this I would like to propose to the Council that we work towards achieving the greatest possible visibility of MAB's international biosphere reserves network as a unique tool for future international efforts to understand and observe changes in the environment at different levels. A major effort should also be undertaken to produce a new generation of multimedia communication techniques for MAB on the theme of sustainable development.

An accompanying effort should be made to train specialists from developing countries in

resource management and research methodology, as well as the implementation of a MAB communications strategy aimed at translating research results into a message that will be understood and acted upon by decision-makers.

Another short-term concern must be to programme MAB activities for 1992/93 as part of UNESCO's biennial plan. As a basis for discussion by the Council, I have indicated some of the possible areas that could be strengthened and others where we think that the time has come for them to be phased out or entrusted to qualified external partners.

This 11th MAB Council is a crucial one because it is asked to take stock of MAB and look forward into the 1990s, which will be critical for the management of natural resources and the global environment. MAB is called upon to make an important contribution in this crucial area.

We are all aware that the present rate and direction of change, the interconnectedness of the world economy and environment, and ability of people to effect change are unprecedented in the history of the planet.

We will need flexible programmes that can respond quickly to changing circumstances, notably financial and political. Such institutional flexibility must be matched by individual willingness to adapt, including attitudinal change that can enable us to forge more effective working methods and relationships. I believe that we have a special responsibility not only to think globally but to act globally in order to facilitate the local solutions that are being developed around the world.

It is in this spirit that I reiterate my welcome and express my wish for a productive and even enjoyable Council session. Thank you very much for your attention.

GLOSSARY OF ACRONYMS

CEC	Commission of the European Communities
CIHEAM	Centre international des hautes études agronomiques méditerranéennes
CILSS	Inter-State Committee for Drought Control in the Sahel
FAO	Food and Agriculture Organization of the United Nations
FAPIS	French acronym of a project entitled "Formation en aménagement pastoral intégré au Sahel"
GRID	Global Resource Information Data Base
HDGEC	Human Dimensions of Global Environmental Change
IALE	International Association for Landscape Ecology
IBN	International Biosciences Network
ICALPE	International Centre for Alpine Environments
ICIMOD	International Centre for Integrated Mountain Development
ICSU	International Council of Scientific Unions
IGBP	International Geosphere Biosphere Programme
IFDC	International Fertilizer Development Center
IHP	International Hydrological Programme
IIASA	International Institute for Applied Systems Analysis
INSULA	International Scientific Council for Island Development
INTECOL	International Association of Ecology
ISBRAM	International Board for Soil Research and Management
ISSC	International Social Science Council
ITC	International Institute for Aerospace Survey and Earth Sciences
IITA	International Institute of Tropical Agriculture
IUBS	International Union of Biological Sciences
IUCN	World Conservation Union
MAB	Man and the Biosphere Programme
NGO	Non-governmental organization
ODA	Overseas Development Administration
ROSTLAC	Regional Office for Science and Technology for Latin America and the Caribbean
RSSD	Response of Savannas to Stress and Disturbance
SCOPE	Scientific Committee on Problems of the Environment
SIL	International Limnological Society
TFAP	Tropical Forestry Action Plan
TME	Comparative Studies in Tropical Mountain Ecosystems
TSBF	Tropical Soil Biology and Fertility
UNAMAZ	Association of Amazonian Universities
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme