Programme on Man and the Biosphere (MAB)

A Practical Guide to

What is MAB?

How does it work?

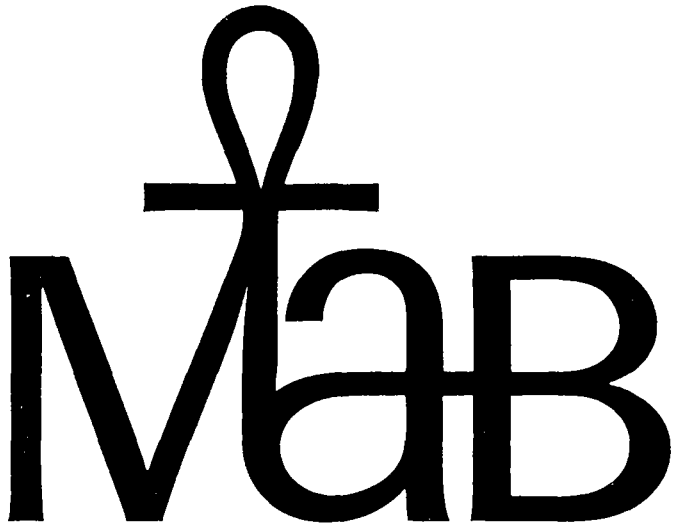
How does one get involved?

Who is responsible for what?

June-1987

UNESCO

A Practical Guide to



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A PRACTICAL GUIDE TO MAB
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1. INTRODUCTION

This Practical Guide to MAB is designed to inform Unesco Member States, MAB National Committees, co-operating institutions and organizations, interested scientists and citizens, about the Man and Biosphere Programme of Unesco (commonly known as "MAB"). It provides an introduction to the objectives, organization and activities of MAB. It seeks to answer the questions:

What is MAB?
What does it do?
How does it work?
How can one get involved?
Who is responsible for what?

Further information can be obtained by writing to:

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2. WHAT IS MAB?

The MAB Programme is a nationally based, international programme of research, training, demonstration and information diffusion aimed at providing the scientific basis and the trained personnel needed to deal with problems relative to rational utilisation and conservation of resources and resource systems and, to human settlements.

The MAB Programme emphasizes research for solving problems: it thus involves research by multi-disciplinary teams on the interactions between ecological and social systems; field training; and the application of a systems approach to understanding the relationships between the natural and human components of development and environmental management.

3. THE MAB STRUCTURE

MAB is a decentralized intergovernmental scientific programme with field projects and training activities in over 100 countries. These are carried out by scientists and technicians from universities, Academies of Sciences, national research laboratories and other research and development institutions under the auspices of more than 100 MAB National Committees.

The International Secretariat for the MAB Programme is located at Unesco Headquarters in Paris at the Division of Ecological Sciences. MAB is one of the intergovernmental scientific programmes of Unesco; it has its own intergovernmental governing body: the **MAB International Coordinating Council (ICC).**

3.1 Overall Organization of the MAB Programme

The organization of the MAB Programme can be represented by the diagram in Figure 1.

There are two levels of organisation, namely within Unesco itself and within the MAB Programme.

Within Unesco, the MAB Programme is one of the intergovernmental programmes of the Science Sector whose activities make up the "s" in Unesco. The MAB Programme, being interdisciplinary in nature, touches on and complements activities of other Unesco programmes. Every effort is made by the Secretariat to coordinate MAB activities with these programmes. For the sciences, these include the International Hydrological Programme (IHP), the activities of the Intergovernmental Oceanographic Commission (IOC), the International Geological Correlation programme (IGCP) and the Coastal Marine Programme (COMAR). Cooperation is also sought with the Social and Human Sciences Sector for activities relating to urban systems, with the Education Sector for environmental education and training in relation particularly with the joint Unesco/UNEP International Environmental Education Programme (IEEP), and with the Sector for Culture for conservation of the natural heritage in biosphere reserves and sites inscribed on the World Heritage List under the convention concerning the Protection of the World Cultural and Natural Heritage.

Within the MAB Programme itself, activities are first coordinated on the national level by the respective MAB National Committees (see section 3.2). The MAB National Committees organise their national contribution to the international MAB Programme through conducting comparative studies (see section 4.4.2), implementing pilot projects (see section 4.4.1), organising training activities (see section 8), and by setting up biosphere reserves which can act as a locus for all the former (see section 5). Within a country, these different elements form the national network of MAB activities (eg the national network of biosphere reserves): for countries within the same geographic or isoclimatic region, they add together to form regional or thematic networks which promote the exchange of information and personnel (see section 6). On the global scale, national activities add together to form international networks, for which the best example is the international biosphere reserve network.

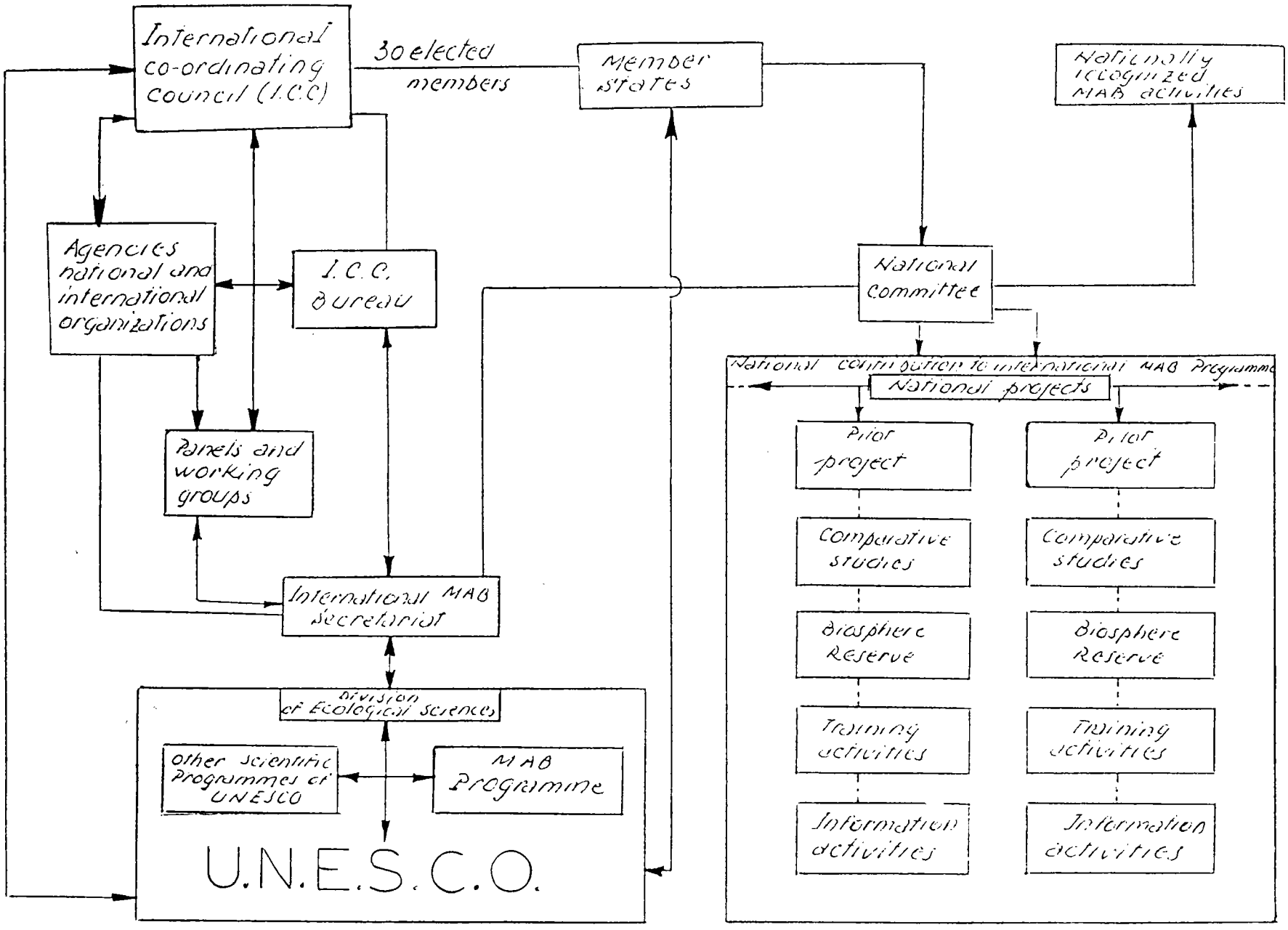
The key link between the nationally-based activities and the international MAB programme in Unesco lies with the MAB National committees, described in the following section. The entry point to Unesco is through the international MAB Secretariat, whose function and composition is described in section 3.6. Unesco itself has some 158 Member States, of which more than 100 participate in the MAB Programme.

3.2 MAB National Committees

Rationale

MAB was launched as an international intergovernmental programme whose execution primarily concerns the Member States of Unesco. The first MAB-ICC therefore recognised that each Member States would need to identify a qualified, permanent focal point at the national level, not only to define and implement national MAB activities, but only to establish and maintain regional and international links using the MAB framework. Thus the Council

Figure 1 - Overall organisation of the MAB Programme



recommended in 1971 that each participating Member State establish a MAB National Committee to fulfill these functions.

Guiding principles

At its first session in 1971, the MAB-ICC outlined the five "guiding principles" which are presented below in up-to-date form:

(i) MAB National Committees should be composed of scientists whose value is recognised by the national and international scientific community;

(ii) MAB National Committees should be interdisciplinary and concerned with the main elements of the MAB Programme;

(iii) MAB National Committees should serve to ensure a full national participation in the programme and this includes, on the one hand, representatives of universities and research institutions and on the other, representatitives of different specialised government agencies. The latter should ensure appropriate coordination both at national and at international levels;

(iv) MAB National Committes should establish adequate links with other National Committees of other governmental and non-governmental programmes (such at the International Hydrological Programme, IHP; the Scientific Committee on Problems of the Environment, SCOPE; the International Geosphere/Biosphere Programmme, IGBP, for example);

(v) MAB National Committees should prepare and recommend to their governments the content of the national programme, taking national priorities into account, as well as practical possibilities and international needs.

Evolution

Since the recommendation of the ICC in 1971, as of mid 1987, there are over 100 MAB national Committees. Over the years, the MAB-ICC has emphasised the following points regarding MAB National Committees:

- membership: MAB national Committees call for a diversity of disciplines and particularly for representation from the social sciences, and from national planning agencies (R and D);

- MAB National Committees need sound scientific advice for developing MAB projects on the national level, and for a rigorous screening process in proposing research projects as MAB pilot projects, comparative studies, biosphere reserves for international recognition under the MAB programme. To meet this need, some MAB National Committees have established specialised secretariats or directorates, or consultative panels of scientific advisors;

- MAB National Committees need to have the necessary national credibility to muster the human and financial resources needed to carry out MAB activities at the national level and to ensure the establishment of links with other MAB National Committees

and the MAB International Secretariat; this role is sometimes simply catalytic but nevertheless indispensable;

- MAB national Committees need strong dynamic leadership by a person or a group of persons well-connected with the national scientific institutions and agencies responsible for planning research, and bilateral and multilateral scientific and technical cooperation;

- in the absence of a formally constituted MAB national committee, Member States should make known to the Secretariat the focal point for MAB contacts. The Unesco National Commission for the country concerned should fill this role if necessary.

Lists of MAB National Committees

The MAB International Secretariat maintains a list of MAB national Committees which is distributed to the MAB Council at each session. MAB national Committees are requested to inform the MAB International Secretariat of any changes in the composition, mailing addresses and telex or telephone numbers in order to keep the list of MAB national Committees as up to date as possible and therefore to facilitate information flow.

3.3 The MAB International Coordinating Council (ICC)

The International Co-ordinating Council of the Programme on Man and the Biosphere (MAB), usually referred to as the **MAB Council** or **ICC**, is composed of 30 elected Member States of Unesco.

At each ordinary session of the Unesco General Conference, normally held every two years, 15 Members of the Council are elected. Council Members can be re-elected.

The individuals who represent the Member States on the Council are generally experts in the fields of ecology, natural sciences, agronomy, environmental, human and social sciences and many are active in implementing MAB activities. They are appointed by their countries.

The Council normally meets once every two years, usually at Unesco Headquarters in Paris. Although each member country has only one vote, it can send as many experts or advisors as it wishes to the Council sessions.

In addition, other Member States of Unesco which are not members of the Council, can send representatives as obervers, as can other UN agencies such as UNEP, FAO, UNDP, WMO, WHO, and non-governmental organisations.

The International Council of Scientific Unions (ICSU) and the International Union for the Conservation of Nature and Natural Resources (IUCN) may act as advisory bodies to the Council.

The role of the Council is:

- to be responsible for guiding and supervising the MAB Programme;

- to review the progress of the Programme (cf. Secretariat report and reports of MAB national Committees);

- to recommend research projects to countries and to make proposals on the organisation of regional or international cooperation;

- to assess priorities among projects and MAB activities in general;

- to co-ordinate the international cooperation of Member States participating in MAB Programme;

- to co-ordinate with other international scientific programmes;

- to consult with international non-governmental organisations on scientific or technical questions.

The MAB international Secretariat reports to each session of the ICC and the Council in turn submits reports on its activities to each ordinary session of the General Conference of Unesco.

3.4 The Bureau of the MAB-ICC

At its meetings, the Council elects a chairman, four vice chairmen and a rapporteur; these form the MAB Bureau. The MAB Bureau meets several times between Council sessions.

Among the Bureau's responsibilities are:

- receiving, reviewing and approving reports from expert working groups and ad hoc committees established by the Council;

- reviewing and approving nominations for biosphere reserves;

- preparation of the next Council session in consultation with the Secretariat;

- in consultation with the Secretariat, review the progress of the MAB Programme, its planning within Unesco, and review any adjustments deemed appropriate;

- any other task the Council wishes to assign to the Bureau to facilitate its work.

3.5 Advisory Panels

These are working groups of specialists, who serve in a personal capacity, that are established by the MAB Council with specific terms of reference.

In the first phase of MAB, there were many Expert Panels and Task Force set up to help develop the scientific aspects of the Programme, but by 1981 their work had been completed.

In 1984, the 8th session of the MAB Council established two Advisory Panels:

(a) General Scientific Advisory Panel, charged with providing general scientific advice to the Council on the scientific aspects of MAB. Its work has been focussed on developing the future orientations of the MAB Programme, which were considered first by the Bureau in April 1986 and then by the Council at its ninth session in October 1986.

(b) Scientific Advisory Panel for Biosphere Reserves which was charged with evaluating proposals for new Biosphere Reserves before they are submitted to the MAB Bureau and with providing scientific advice on the criteria for selecting Biosphere Reserves, the effectiveness of the network and the implementation of the Biosphere Reserve Action Plan.

At its 9th session, the MAB Council considered that the General Scientific Advisory Panel had completed its work, which had laid the basis for the MAB Programme for the 1990s. The work of the Advisory Panel for Biosphere Reserves is continued through small ad hoc groups of experts which advise the MAB Bureau on selected topics.

3.6 MAB International Secretariat

The functions of the MAB International Secretariat are as follows (cf. MAB Report Series N° 1, Annex IV):

(i) provide the necessary services of the Council and the meetings of its Bureau, Committees and working groups (organisation of meeting rooms, interpretation, preparation and distribution of working documents, report writing and dissemination);

(ii) take any day-to-day measures required to co-ordinate the execution of the international programme as recommended by the Council;

(iii) maintain liaison with MAB National Committees for the execution of the MAB Programme (including links through the Unesco Regional Offices, advice to MAB National Committees, promotion of MAB activities in Member States not yet participating in the programme, etc);

(iv) cooperate closely with the Secretariats of other international governmental and non-governmental organisations, for example UNEP, FAO, WHO, WMO, ICSU, IUCN, IUFRO, as well as those of relevant Unesco activities (IHP, IOC, World Heritage Convention, for example).

The Division of Ecological Sciences of Unesco, provides the MAB International Secretariat. In addition to the tasks outlined above, the Division of Ecological Sciences is charged with the following:

(i) handling of funds in trust provided by donor countries, not only for MAB activities but for related projects;

(ii) carrying out certain activities relating to research, training and information exchange on ecology and related disciplines which were not part of MAB but for which Unesco has responsibility;

(iii) ensuring coordination with the work of the other Divisions and Sectors of Unesco for activities of relevence for the MAB Programme, for example with the Education Sector for environmental education activities, with the Social Sciences Sector for human population activities;

(iv) providing the secretariat of the natural part of the World Heritage Convention, including the implementation of activities financed by the World Heritage Fund.

The Division of Ecological Sciences has, over the last years, consisted of approximately 10 professional staff members plus another 10-12 secretarial and clerical staff. All professional staff members are specialists in fields related to the work of MAB. Most have field experience in several countries around the world, and come from a different linguistic, cultural and geographical backgrounds.

Each member is usually assigned one thematic part of the MAB Programme (eg. one project area) plus one geographical responsibility (eg. francophone Africa; South-East Asia) for helping the development of MAB activities in that region in general. The Secretariat also has professional staff members based in the Unesco regional offices in Africa (Dakar, Nairobi), Latin America (Montevideo), and South-East Asia (Jakarta) who are responsible for developing the MAB Programme in their regions. The Secretariat is also strengthened by specialists seconded by MAB national Committees to Unesco for MAB activities, as well as by consultants taken on for shorter term assignments for specific tasks. Together, the persons working within the Division of Ecological Sciences have worked as a closely bound team under the leadership of the Director of the Division, Secretary for the MAB Council.

The MAB International Secretariat has the support of the other competent bodies of Unesco.

4. MAB RESEARCH

4.1 The MAB project areas

When MAB was launched in 1971, its research programme was structured into 13 project areas, most of which had an ecosystem or geographic focus. A fourteenth project area was added in 1974. The list of these project areas is as follows:

1. Ecological effects of increasing human activities on tropical and subtropical forest ecosystems.

2. Ecological effects of different land uses and management practices on temperate and mediterranean forest landscapes.

3. Impact of human activities and land use practices on grazing lands: savana and grassland (from temperate to arid areas).

4. Impact of human activities on the dynamics of arid and semi-arid zones" ecosystems, with particular attention to the effects of irrigation.

5. Ecological effects of human activities on the value and resources of lakes, marshes, rivers, deltas, estuaries and coastal zones.

6. Impact of human activities on mountain and tundra ecosystems.

7. Ecology and rational use of island ecosystems.

8. Conservation of natural areas and of the genetic material they contain.

9. Ecological assessment of pest management and fertilizer use on terrestrial and aquatic ecosystems.

10. Effects on man and his environment of major engineering works.

11. Ecological aspects of urban systems with particular emphasis on energy utilization.

12. Interactions between environmental transformations and the adaptive, demographic and genetic structure of human populations.

13. Perception of environment quality.

14. Research on environmental pollution and its effect on the biosphere.

4.2 The main areas of concentration

The above 14 project areas have continued to be the focus for the different national contributions to the MAB Programme. On the international level however, in the period 1975-1980, the financial and human resources of the MAB Secretariat were concentrated more or less on the following six main areas in order to ensure their international coordination.

1. Coastal areas and islands;
2. Humid and sub-humid tropics;
3. Arid and semi-arid zones;
4. Temperate and cold zones;
5. Urban systems;
6. Biosphere reserves.

4.3 The new research orientations

In 1984, the MAB Council considered that it was necessary to establish an independant, expert advisory panel in order to review the scientific programme of MAB and make recommendations on ways and means to disseminate and implement new criteria, concepts, techniques and methods throughout MAB activities. Indeed, while during the 1970s and the 1980s, the state of knowledge and the understanding of the characteristics and processes of the biosphere had advanced very much, in part due to MAB activities themselves, the scale and the nature of human issues relating to natural resources had changed a great deal. Equally important, the technologies and the intellectual approaches to studies of both social behaviour and natural systems had progressed considerably. In particular, there had been a change of perception of and within MAB of the role of the

"M" factor. Early MAB studies tended to focus on the study of the characteristics and processes of the natural environment as they might be in the absence of human intervention and also of the study of the impact of human actions in disturbing a system that would otherwise be more or less in equilibrium. In more recent years, there had been a growing trend to consider environmental and biosphere changes caused by human activities as an integral part of a continually changing and interacting environment. In other words, the idea of Man and the Biosphere had evolved to one of Man in the Biosphere.

To advise on how MAB should adapt to take account of these changes, the MAB Council, at its 8th session in 1984, established the General MAB Scientific Advisory Panel (see section 3.5). The principal outcome of the Panel's discussion had been a proposed restructuring of the international research plan of MAB with three needs in mind:

- to maintain a continuity with the work that has evolved over the past 15 years under the MAB Programme;

- to develop new research directions that would link recent advances in science with the new generation of environmental issues and resource opportunities for the 1990s;

- to produce a research plan that would be achievable within the resources likely to become available for the undertaking and the servicing of the Programme.

At its 9th session, the MAB Council considered the report of the General Scientific Advisory Panel (MAB Report Series N° 59) and endorsed the proposal to develop four new research orientations within MAB in the 1990s. These orientations are briefly described below as they were originally formulated by the General Scientific Advisory Panel. Some are more clearly defined at this time than others, notably orientation N° 3 on human investment. In the next few years, more work will be undertaken to further refine and spell out these orientations, how they relate to the 14 MAB project areas and the working hypotheses to be tested. In the meantime, the MAB Council has encouraged MAB National Committees to review the following orientations in the light of their own activities and priorities to prepare their MAB contribution for the 1990s.

1. Ecosystem functioning under different intensities of human impact:

   Better understanding of ecosystem functioning is necessary for three reasons: (1) a certain type of use may be considered as being sustainable for a relatively short time period depending on the socio-economic context; (2) ecosystems may be affected by anthropogenic factors coming from outside the system (i.e., acid rain); (3) ecosystems face short and long-term "natural" changes, imposed from both within and outside the system (e.g., climatic changes). In many cases response to these forces by the most basic ecosystem processes (e.g., water cycles, nutrient cycles, etc.) are poorly understood in both time and space, and this ignorance often leads to wrong decisions and poor ecosystem management. This proposed orientation emphasizes comparative studies of the important processes in the functioning

of ecosystems, subject to different intensities of human impact. Studies should include both regional comparisons of ecosystems affected by similar degrees of human impact, and local comparisons, often based on biosphere reserves, of the relative importance of processes within an ecosystem that is subject to different degrees of human impact.

Methods will include mapping of the resource base, analysis of trends, and evaluation of the importance of different processes in the system. The importance of a social historical perspective of system responses to human impact must be emphasized.

2. Management and restoration of human-impacted resources:

Ecosystem restoration is needed to recover the loss of amenities of ecosystems that have been heavily damaged. While under some circumstances the restored state may be a mature or climax ecosystem, this is not necessarily always the case. Humans have a great variety of needs that can be satisfied by an equally variable set of ecosystem states which can be considered as desirable under the proper circumstances. The research units addressed under MAB would not only be the ecosystems but also the resource management systems. In the context of developing societies particular attention should be paid to the functioning and the logic of traditional production systems. Activities include: innovative and new syntheses which should be presented in international meetings; resource papers; documentation of case studies (including examples of natural restorations); and field research. Field research should take the form of manipulative experiments to learn about the susceptibility of human-impacted ecosystems to management, and research designed to develop management prescriptions for specific situations or management problems.

3. Human investments and resource use:

Investments of knowledge, time and money drive change. Such investments can be for improvement in social welfare, for furthering economic development, for enhancing resource sustainability, or all three. If the investments are narrowly based, however, the consequence can be the reverse of that desired. Those reverse consequences are not only local or regional; they are also global. Therefore, the link between human welfare and ecosystem sustainability is through investment processes that reflect local, regional, and global forces. For this reason, this orientation requires the integration of knowledge of social perceptions and expectations, of the behaviour of biosphysical systems and of the process of investment, disinvestment, and reinvestment. This orientation emphasizes change and evolution, and therefore it provides a particular opportunity to extend the paradigms, procedures and methods used in the MAB Programme (e.g. regional sysnthesis, historical analysis, interactive procedures to link science and policy).

4. Human response to environmental stress

There are many examples of environmental influences on human health and welfare: e.g. the impacts of natural hazards, noise pollution, heavy metals, pesticides, fertilizers and environmental pollution. Some human environmental changes have many positive impacts on health and these environments are suitable for active recreation activity and as a means to restore the energy, health, mood, and spirit of people. The MAB Programme with its strong combination of natural and socio-economical studies of human ecology has the opportunity not only to make an important input in ongoing environmental health projects but also to take leadership in such multidisciplinary research dealing with positive and negative impacts of environmental changes on human health and welfare. This orientation should be phased in as interest, opportunity and budgets allow.

These orientations are discussed more fully in the report of the General Scientific Advisory Panel (MAB Report Series N° 59), and in the Report of the 9th Session of the MAB Council (MAB Report Series N° 60).

4.4 Implementation of the International Programme

The time period of concern covers a transition period (1987-89) and the Unesco Medium Term 1990-1995. There are two main types of main activity which can be recognised for implementing the MAB international Programme. These are pilot projects and comparative studies which are described below. Such activities share the common features that they are nationally based, are proposed by the MAB national Committee for the country concerned as part of the International MAB Programme, and recognised by the MAB Council after evaluation against a specific set of criteria adopted for this purpose by the MAB Council. A third type of research activity is research and monitoring in biosphere reserves for which a full description is given in Chapter 5.

MAB National committees can of course conduct other national research activities using the MAB emphasis or the "MAB approach" which are designed to meet national objectives and for which recognition is given at the national level only.

4.4.1 MAB International Pilot Projects

Pilot projects of the sort pioneered within MAB constitute one research approach to tackling complex environmental problems. They encompass a unique combination of characteristics and outputs, and fulfill a core function in the future international research programme of MAB. They continue to play a crucial role as testing grounds for putting the MAB approach into practice and for demonstrating at the ground level the fruits of applying such an approach to development needs and environmental conservation.

a) Criteria: In line with lessons gained from early pilot projects, the MAB Council decided that the following criteria are to be used in the process of screening, planning and implementing future pilot projects:

(i) focus on a land use or resource management problem of priority

at the local and national level, but at the same time having a wider regional and international significance (i.e., the results of the project are likely to be of interest to other countries);

(ii) concern with the interfaces between human populations, their activities and their environment and the boundaries between socio-economic and physical and biological systems;

(iii) availability, or likely availability, of sufficient financial and technical resources required to carry out a pilot project;

(iv) development of mechanisms for the valorization and dissemination of results to those concerned with planning, management and to local populations;

(v) advantage to be taken of the opportunities offered by the pilot project for institutional development in the country or region concerned.

b) Procedure:

MAB Secretariat provides MAB National Committees with the reports of the MAB Council (for example MAB Report Series N° 60) and the Practical Guide to MAB, drawing attention to the criteria for MAB international pilot projects and recommendations for concentration on specific ecosystems or geographic regions. The MAB Secretariat should also communicate the list of existing recognised pilot projects in order to enable coordination of national activities with those of other countries.

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MAB National Committees review existing national research projects with a view to their expansion following the MAB criteria to become an international MAB pilot project. MAB National Committees also plan new research activities for which the inherent objectives and experimental design correspond to MAB criteria.

↓

MAB National Committees select the ongoing and/or planned research project to be proposed for international designation designation as a MAB pilot project.

↓

MAB National Committees submit the projects, stating objectives on the national and international levels, timetable and description of the different stages of implementation including the built-in evaluation procedure, logistic arrangements within the country, name(s) and addresses of project leader(s) and the institution(s) concerned, national financial contribution, other sources of support (e.g. bilateral). The proposal should be accompanied by a letter from the Chairman of the MAB National Committee concerned and submitted to the MAB Secretariat.

↓

MAB Secretariat reviews proposals for pilot projects, acknowledges and requests further information if necessary and submits these to the Bureau of the MAB-ICC for approval.

↓

The MAB Bureau reviews the proposals against the criteria to be met by international pilot projects and seeks outside expert advice if it deems necessary. The MAB Bureau decides whether the proposed project is to be recognised as an international MAB pilot project.

↓

The MAB Secretariat submits the list of international MAB pilot projects to the MAB Council. This list is widely circulated by the Secretariat to all MAB National Committees.

↓

The MAB Secretariat, two years after the approval of each pilot project, requests a brief report from the MAB National Committee concerned for submission to the MAB Bureau.

↓

The MAB Bureau decides whether or not to retain the activity as an internationally recognised MAB pilot project.

4.4.2 Comparative studies

Comparative studies are intended to develop a better theoretical and operational basis for understanding the replicability and comparability of ecological information, and thus advance the subject towards a more predictive science. The specific objective of MAB comparative studies is to test a range of hypotheses under different ecological situations and human impacts.

a) Criteria

(i) enunciation of general and specific hypotheses combining both theoretical and applied objectives;

(ii) application of appropriate methods and techniques standardized so as to ensure repeatability and comparability;

(iii) appropriate choice of sites in relation to the stated hypotheses. In considering sites, attention should be paid to their structural and/or functional similarity or types of impact;

(iv) designing the programme such that theories, methods or management insights will be developed and tested leading to final regional or inter-regional syntheses.

b) Procedure

(i) **The MAB Secretariat** provides MAB National Committees with the report of the MAB Council and the Practical Guide to MAB drawing attention to the criteria for comparative studies, ongoing comparative studies within MAB and possible areas of concentration for comparative studies within MAB, as endorsed by the MAB Council (see MAB Report Series N° 60, Annex 9). The MAB Secretariat can provide a MAB study outline for each comparative study, which is updated as each study develops and takes on a firmer shape. The two-page study outline contains such information as: obectives; rationale; experimental principles; examples of hypotheses to be tested; methods to be used; measures for coordination and synthesis, including the name and contact address of the chairman of the coordinating committee for the study.

(ii) For each study, there is a small group, or coordinating committee comprised of 5-6 persons, backed up where appropriate by a somewhat larger group of scientific advisers, with independent assessors being invited to participate in periodic review and synthesis meetings. A MAB representative serves on each coordinating committee. The Secretary of the MAB Council or a member of the MAB Secretariat designated by him/her also takes part when appropriate, on an ex officio basis.

(iii) The international coordinating committee for each comparative study has the following tasks: to oversee the planning and the execution of the programme of the comparative study, including the drawing up of detailed proposals describing the aims, rationale, approach and timetable for implementation; to establish contact with potential contributors to the programme and invite their active participation; to elaborate and diffuse methodological guidelines for field research; to develop mechanisms for the screening, review and evaluation of field projects contributing to the programmes; to prepare and submit applications for funding of the core budget to appropriate agencies; to coordinate the major activities of the study by organising workshops and regional meetings; to organise the preparation of progress reports and publications synthesising the results of the study.

(iv) The non-governmental scientific partner with Unesco-MAB in a particular comparative study takes primary responsibility for assuring the scientific rigour of the work undertaken.

(v) MAB National committees or individuals or groups of scientists interested in taking part in a comparative study should make direct contact with the chairman of the coordinating committee for the comparative study concerned, indicating their interest to participate and providing details of their proposed contribution. This information should be copied to the MAB Secretariat.

(vi) The MAB Bureau periodically reviews progress reports on the various comparative studies and, as appropriate, makes its own evaluation, with recommendations for shifts in emphasis and directions for future work.

(vii) The MAB Secretariat submits summary progress reports on the comparative studies to the MAB Council.

5. BIOSPHERE RESERVES

5.1. Definition

Biosphere reserves are protected areas of representative terrestrial and coastal environments which have been internationally recognized under the Unesco MAB Programme for their value in conservation and in providing the scientific knowledge, skills and human values to support sustainable development. Biosphere reserves are united to form a worldwide network which facilitates sharing of information relevant to the conservation and management of natural and managed ecosystems.

5.2 Biosphere reserves and the MAB Programme

In the beginning of the MAB Programme, MAB Project Area 8 concerned the conservation of natural areas and of the genetic material that they contain. The rationale behind this theme was the need to counter the increasing loss of living species, the lack of knowledge of how to conserve them and the inadequacies of traditional approaches to nature protection. This project area was developed subsequently in 1974 by a Task Force which drew up a set of objectives and characteristics of special sites, called "biosphere reserves" to identify them with the rest of the MAB Programme. Inherent in the original formulation of the biosphere reserve concept was the idea that biosphere reserves serve as a locus, or logistic base, for national activities - which now include pilot projects and comparative studies - which contribute to the MAB Programme at the national and international levels. Also, there was the basic idea that the human factor in MAB should be present and benefit from biosphere reserves, particularly in that they generate the knowledge and skills required for rational, sustainable development.

Over the years, biosphere reserves and the international biosphere reserve network they constitute have gradually become a key element of the MAB Programme in general (as at mid 1987 there are 266 biosphere reserves in 70 countries). It is for these reasons that biosphere reserves are given a privileged place in this Practical Guide, and that one of the first actions that new MAB National Committees is encouraged to do is to consider the establishment of a biosphere reserve to act as a focus for future MAB work.

5.3. The Action Plan for Biosphere Reserves

In 1983, the First International Biosphere Reserve Congress was jointly convened in Minsk, Byelorussian SSR by Unesco and UNEP, and in cooperation with FAO and IUCN. This Congress laid the groundwork for the Action Plan for Biosphere Reserves which was adopted by the MAB-ICC at its eighth session in December 1984 at its eighth session in 1984. The Action Plan was subsequently published in "Nature and Resources" Volume XX N° 4 in Chinese, English, French, Spanish and Russian and widely distributed as offprints throughout the world. This Action Plan identifies a range of actions grouped under 9 objectives for consideration by governments and concerned international organizations in developing the multiple functions of biosphere reserves within the overall context of the MAB Programme. These actions concretely serve to implement the World

Conservation Strategy. In summary, governments and international organizations (notably UNEP, FAO, Unesco, IUCN) are invited to undertake activities which will improve and expand the international biosphere reserve network, to develop basic knowledge for conserving ecosystems and biological diversity and to make biosphere reserves more effective in linking conservation and development in fulfilling the broad objectives of MAB (see Section 10.3 on the Action Plan for Biosphere Reserves). One of the actions of the Action Plan foresaw the establishment of a Scientific Advisory Panel for Biosphere Reserves whose task, amongst others was to refine criteria for the selection and management of biosphere reserves (see section 3.5). The sections that follow hereafter are based on the recommendations of the Scientific Advisory panel for Biosphere Reserves, as endorsed by the MAB Council.

5.4 Guidelines for selection

The initial recommended criteria and guidelines for the choice and establishment of biosphere reserves were elaborated by a special Task Force in 1974 and presented in MAB Report Series N° 22. In reviewing these criteria, the Scientific Advisory Panel for Biosphere Reserves considered that there were three main concerns present in the biosphere reserve concept from the beginning, although at the time they were not clearly expressed nor articulated. These were:

(i) the need to reinforce the conservation of genetic resources and ecosystems and the maintenance of biological diversity (conservation concern);

(ii) the need to set up a well-identified international network of areas directly related to MAB field research and monitoring activities, including the accompanying training and information exchange (logistic concern);

(iii) the need to associate concretely environmental protection and land resources development as a governing principle for research and education activities of the MAB programme (development concern).

These three concerns can follow from the triangular conceptual framework of Figure 2 below made by the interlinking of the conservation, logistic (research and monitoring of international significance) and development concerns. It is the combination - and harmonization - of these three concerns which characterize the Biosphere Reserve.

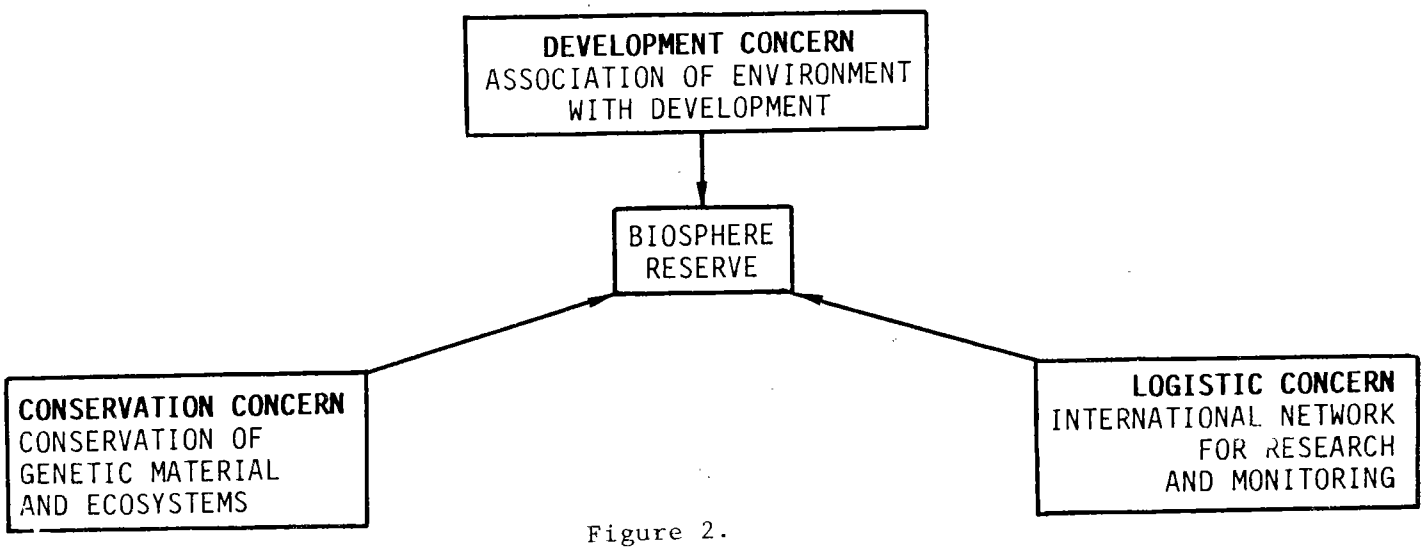


Figure 2.

A. PRIMARY CONCERNS

1) Conservation concern:

Biosphere reserves should help to strengthen the conservation of biological diversity, genetic resources and ecosystems. The following factors are important:

(a) Value for conservation

A biosphere reserve must contain at least one sample of an ecosystem that is typical of a biogeographic unit, selected after criteria of diversity, naturalness and effectiveness as a conservation unit. The area concerned should be large enough to ensure the sustainability of viable populations of the species of the ecosystem. Such samples shall normally constitute the core area (or core areas) and should be effectively protected so that they are minimally disturbed. Human activities in the core area are limited to those which will not adversely affect the continuing natural evolution and functioning of the ecosystem.

(b) Coverage

There should be biosphere reserves in as many biogeographic regions and covering as many biological communities as possible in order that the global network of biosphere reserves can contribute to the conservation of terrestrial and coastal/marine biological diversity and provide models for sustainable and appropriate development. In terms of conservation, biosphere reserves alone are not intended to protect all of biological diversity but complement other efforts.

2) Logistic concern (international research and monitoring network)

This "logistic" concern covers two ideas: that of providing an operational base and facilities for research and monitoring (as well as training and environmental education activities); and also that of contributing to an international network by communicating information deriving from MAB research and monitoring. The following factors are important:

(a) Potential for scientific research and monitoring

The authorities responsible for biosphere reserves should have the potential for participating in interdisciplinary research programmes involving the natural and social sciences. Hence, biosphere reserves should have, or should plan to have facilities for coordinated research, such as for determining the requirements for conserving biological diversity, assessing the impacts of pollution on the structure and function of ecosystems, evaluating the effects of traditional and modern land use practices on ecosystem processes, and developing sustainable production systems for degraded areas. Some elements which can be used in evaluating the potential for scientific research and monitoring include:

- accumulation of scientific knowledge over long time periods;

- history of scientific research programmes and existence of ongoing projects;

- a balance of fundamental research and applied studies;

- emphasis on research to resolve specific land use or environmental problems;

- participation in international programmes on research and monitoring;

- availability of research facilities and logistical support.

In some cases, proposed biosphere reserves may not have a history of research, nor have elaborated a research programme. For these, the concerned MAB National Committee should certify that the administrative authorities responsible for the planning and management of the proposed biosphere reserve acknowledge their commitment to facilitate a programme of research and monitoring.

(b) Commitment to the MAB Programme and international cooperation

Biosphere reserves should make a commitment to work within the international MAB framework for comparative studies of similar environmental problems in different parts of the world; for testing, standardising and transferring new methodologies; and for cooperating in the development of information management systems. In nominating and encouraging activities in biosphere reserves, MAB National Committees should acknowledge their commitment to pursue the objectives identified in the Action Plan for Biosphere Reserves.

3) Development concern

Biosphere reserves should associate environment and land and water resources development in their research, education and demonstration activities. The following factors are important:

(a) Local organization and potential for participation of local people

Each biosphere reserve (or each administrative unit in biosphere reserves containing multiple sites) should have a managing authority which must acknowledge its responsibility in cooperating with local and regional institutions for planning and managing the biosphere reserve in order to benefit the people living in or around its boundaries. The managing authority should also indicate its willingness, as is possible and appropriate, to involve local people in the decision-making process pertaining to the management of the reserve and to its various activities.

(b) Value as a model for development

In terms of sustainable development, it is highly useful that a biosphere reserve contains a representation of the landscape, soils,

microclimate, etc. occurring in a larger surrounding area so that the research taking place in the biosphere reserve wille be relevant and can be applied in this larger region.

The biosphere reserve as a whole, including the core(s), buffer zone and transition area should be, or have the potential to be, a model of the harmonious relationship between man and nature, reflecting the land use patterns and the cultural and ethnic characteristics of the biogeographic unit. It should be an example that effectively links conservation to development, in which the benefits of the biosphere reserve radiate into the surrounding area. The biosphere reserve should have the potential to play a significant role in solving the interrelated environmental, land use and socio-economic problems found elsewhere in the region or country.

(c) Potential for extension and demonstration

The work conducted in the biosphere reserve should, whenever possbile, lead to practical results which could be used by the local population for land and water resource development through extension and demonstration activities.

B. SPATIAL DISTRIBUTION OF THE THREE PRIMARY FUNCTIONS OF BIOSPHERE RESERVES

While the spatial organization has to be adapted to a large variety of local situations, a biosphere reserve should normally consist of the three following types of areas: (see Figure 3).

1. Core area or areas

Each biosphere reserve includes one or several **core areas** which are **strictly protected according to well defined conservation objectives** and consist of typical samples of natural or minimally disturbed ecosystems. Collectively these core areas should be large enough to be effective as in situ conservation units and, whenever possible, have value as benchmarks for measurements of long term changes in the ecosystems they represent and in the biosphere. The size and the shape of the core area(s) depend on the type of landscape or aquatic environment in which they are located and on the conservation objectives they are intended to meet. They can obviously be much larger in regions of low human population density than in regions with heavier human pressure and less available land. Core areas are usually delineated, but may remain undelineated in certain cases within a delineated buffer zone.

2) Buffer zone

The core areas are normally surrounded by a **buffer zone** which must be **strictly delineated** and very often corresponds, together with the core areas, to a single and autonomous administrative unit (e.g: national park). This buffer zone must have a clearly established legal or administrative status even when several administrative authorities are involved in its management. Only activities compatible with the

protection of the core areas may take place. This includes, in particular, research, environmental education and training, as well as tourism and recreation or other uses carried out in accordance with the management requirements. Besides its other functions, the buffer zone often serves to protect areas of land that could be used to meet future needs for experimental research.

3) Transition area

The core area(s) and the buffer zone are surrounded by a **transition area** which promotes several characteristic functions of the biosphere reserve, particularly its development function. It may include experimental research areas, traditional use areas or rehabilitation areas. Usually, the transition area as a whole is not strictly delineated and corresponds more to biogeographic than to administrative limits. It normally extends the above-mentioned areas into a larger and open area where efforts are made to develop cooperative activities between researchers, managers and the local population, with a view to ensuring appropirate planning and sustainable resource development in the region while maintaining the greatest possible harmony with the purposes of the biosphere reserve. The management of the transition area is usually the responsibility of a variety of authorities and therefore requires appropriate coordination arrangements.

C. CLUSTER BIOSPHERE RESERVES

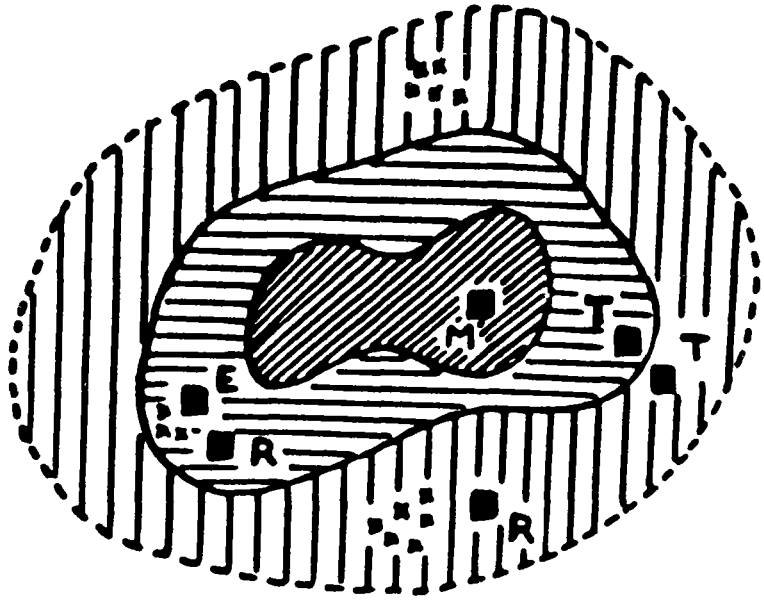
The cluster concept refers to a combination of a number of non-contiguous areas - and possibly of research and education centres or laboratories - serving the various functions of biosphere reserves. The overall spatial distribution is comparable to that of a biosphere reserve made up of only one land unit (see Figure 4). The different parts of a cluster biosphere reserve are not usually administered by the same entity and hence the overall management of a cluster biosphere reserve benefits from coordinating mechanisms through which the various administrative authorities concerned - as well as the local population - will cooperate.

D. MANAGEMENT PLANS

Each biosphere reserve should prepare and implement a management plan covering in particular the core areas and the buffer zone. However, such plans take time to prepare and usually are not ready when the site concerned is being proposed as a biosphere reserve. Nevertheless, the MAB National Committees should certify that the administrative authorities responsible for the planning and management of the proposed biosphere reserve acknowledge their commitment to pursue the objectives identified in the Action Plan, and in particular to prepare the corresponding management guidelines.

5.5 Procedure for designation of Biosphere Reserves

MAB Secretariat provides MAB National Committees with the revised Biosphere Reserve Nomination form, the list of existing biosphere reserves, the Practical Guide



CORE AREA (STRICTLY PROTECTED)

BUFFER ZONE (STRICTLY DELINEATED)

TRANSITION AREA

HUMAN SETTLEMENTS

R RESEARCH STATION OR EXPERIMENT

M MONITORING

E EDUCATION & TRAINING

T TOURISM & RECREATION

Schematic zonation of a Biosphere Reserve

(In this zonation, already proposed in 1974, the core area is strictly protected. The buffer zone (formerly called 'inner buffer zone') can be used for regulated non-destructive activities and is strictly delineated. A national park normally corresponds to a core area together with a buffer zone of this type. The transition area (which was originally called 'outer buffer zone') covers other functions of the biosphere reserve including experimental research, traditional use, rehabilitation, etc., and it extends to form an area of cooperation in the biosphere reserve.)

Figure 3.

to MAB and the Action Plan for Biosphere Reserves drawing attention to the guidelines for the selection of biosphere reserves and the need for adequate biogeographical coverage of the international biosphere reserve. Additional information on biogeographical classification systems is provided upon request.

↓

MAB National Committee (or its national working group or directorate for biosphere reserves) reviews potential sites using guidelines and taking account of the need for coverage in the biosphere reserve network. MAB National Committee secures cooperative agreements with local authorities responsible for the ownership and management of the proposed biosphere reserve.

↓

MAB National Committee completes biosphere reserve nomination form, obtains signature of Chairman and submits nomination with maps and supporting documentation to the MAB Secretariat.

↓

MAB Secretariat registers nomination, acknowledges receipt and submits to a small group of experts on biosphere reserves. MAB Secretariat can also request further information from MAB National Committee if deemed necessary.

↓

Advisory group of experts reviews nomination and makes recommendations to Bureau of MAB-ICC.

↓

MAB Secretariat requests further information as appropriate from the MAB National Committee, and submits nomination and the recommendation of the advisory group to Bureau of MAB-ICC.

↓

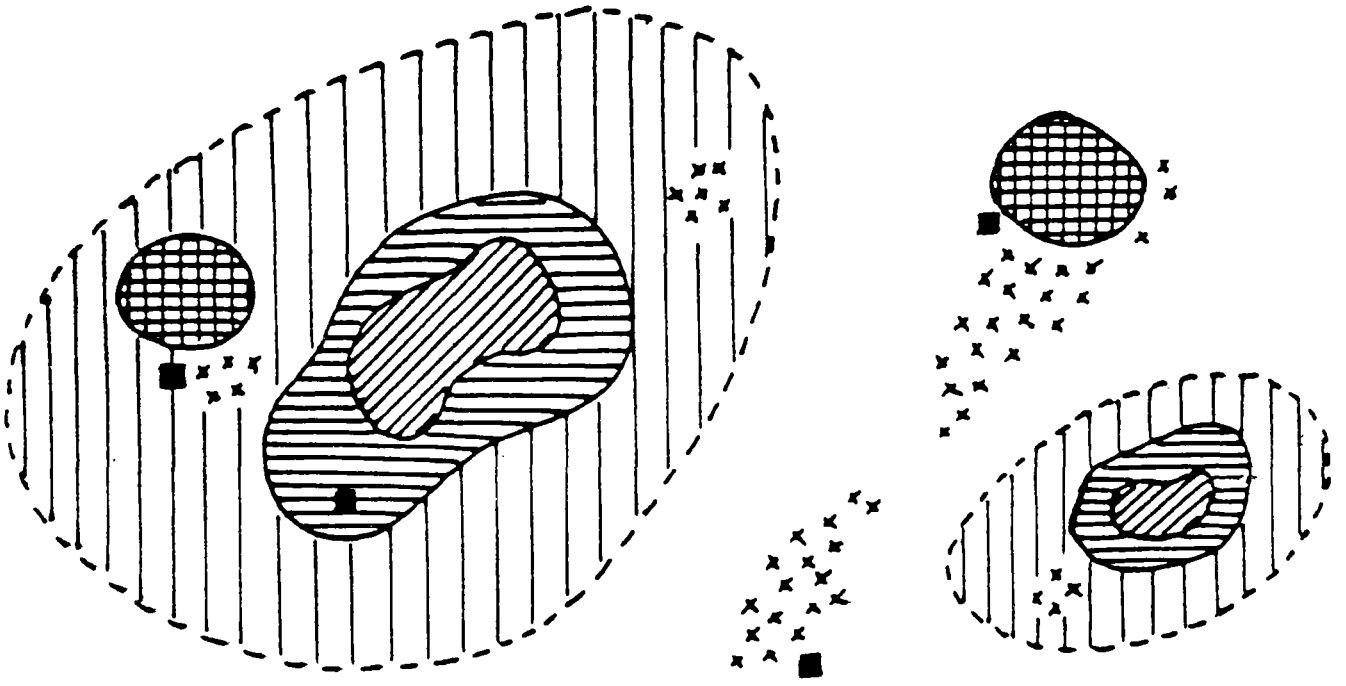
Bureau of MAB-ICC decides on nomination taking account of the advisory group's recommendation. On approval, the site is officially included in the international biosphere reserve network at this time.

↓

MAB Secretariat transmits letter of approval and biosphere reserve certificate bearing the site's name, signed by the Director-General of Unesco, to the MAB National Committee concerned.

↓

MAB National Committee transmits certificate to biosphere reserve manager and, whenever possible, holds dedication ceremony.



Cluster Biosphere Reserve

CORE AREAS

BUFFER ZONE

TRANSITION ZONE

EXPERIMENTAL RESEARCH AREAS

RESEARCH OR TRAINING FACILITIES

Figure 4.

6. MAB NETWORKS

MAB supports international cooperation in research through its **international networks** where the sharing of information and resources is mutually beneficial to the cooperating countries. These networks are all informally constituted and there is no "official" MAB elaboration procedure. They differ greatly in character and in objective, as well as in their regional or international extent and degree of development. Some are based on geographical proximity, such as the countries of the southern cone of South America, and others on common linguistic or socio-cultural background, such as Francophone African countries. Wider in scope are the **MAB Pilot Project Networks** and the **Biosphere Reserve Network**, where common research frameworks and well-developed scientific exchange are encouraged.

MAB Networks, whether regional or international are linked through:

- voluntary cooperation;
- information exchange;
- exchange of scientists and researchers through consultant missions, study tours, field visits, training courses, etc.;
- joint meetings, seminars, workshops.

In addition, some Networks are linked through:

- comparability of research design and data collection;
- joint training programmes;
- formal information systems;
- network newsletters.

Several of the MAB Networks are described in the following sections as examples. Note that some of these, such as the biosphere reserve network, are entirely dependant on MAB. Others, such as the Alpine network, have been grafted on the work of other programmes.

6.1 The Northern Science Network

The Northern Science Network was developed informally in the late 1970's by scientists working in high latitudes to who wanted to share their knowledge on the distinctive biological and environmental processes and on the historical, cultural and technological developments in these low-energy systems. Initially, topics of interest to the Northern Science Network were: **(1)** studies on sub-arctic birch forests; **(2)** development of biosphere reserves, particularly as reference sites; **(3)** science policy in northern countries; and **(4)** sub-arctic land use and grazing animals. In 1986, the MAB Council, at its 9th session, recommended that the Northern Science Network be endowed with a more permanent, formal structure through the MAB National Committees of the northern countries. It is envisaged that a revised programme with new focal points will be drawn up which will then provide for specific collaborative projects of interest to the northern science

community.

6.2 The network on Smaller Mediterranean Islands, and its extensions

Following on from MAB project area 7 on the ecology and rational use of island ecosystems, a cooperative network of scientists and managers has been created for the smaller islands of the Mediterranean Sea, with projects on the islands of Gozo (Malta), Skiathos, Skopelos, Chalki (Greece), the Aeolian Archipelago (Italy), Formentera and Gomera (Spain) and Kerkennah (Tunisia). These islands are characterised by their ecological and socio-economic fragility and by new, increased pressures from tourism. The work of this well established network has been extended to both sides of the Atlantic and to the Caribbean region.

6.3 The Alpine network

Within the framework of MAB project area 6 on the impact of human activities on mountain and tundra ecosystems, the countries of the European Alps have organised a regional network of MAB research projects taking account of initiatives of other organisations, for example the Council of Europe. All situations from relatively undisturbed mountain ecosystems to largely modified systems are covered, under topics such as the balanced co-existence of agricultrue, forestry and tourism. Exchanges of research workers, regional consultations facilitate the sharing of experience, the development of further complementarity between different research efforts and the harmonisation of methodologies.

6.4 Network of MAB activities on Humid and Sub-Humid Tropical Forests

The general structure of this network which was developed over the first phase of MAB, consists of three clusters of pilot projects (Latin America, Africa and South-East Asia) and cooperating institutions located in both temperate and tropical countries. The strongest links are **within** the clusters of pilot projects within each continent, with less intense interactions between continents. Note that the pilot projects have as an ensemble dealt with a wide range of land use issues. Recently launched projects within the network include a project on the integrated development of the Mayombe region in the Congo. In the future, it is proposed to concentrate research efforts on more finely focussed fields, for example, on questions relative to the maintenance of tropical soil fertility, which has led to the establishment of a MAB Cooperative Research Programme in this area.

6.5 Network of MAB Activities on arid and semi-arid zones

This network is also based on regional clusters in Latin America, Africa South of the Sahara, North Africa and Asia (excluding West Asia). The research foci for these regional groups differ. In Latin America, the focus is on tropical and sub-tropical pastures, with particular emphasis on the **Chaco** as a region and **Prosopis** as a multi-purpose plant. In Africa, a network is being developed linking integrated pilot field projects on the sustainable management of pastoral lands in drought-affected areas of Burkina Faso, Ethiopia, Kenya, Lesotho, Sudan and Tunisia. These field projects involve the establishment of considerable research infrastructure and depend on support from multi-lateral or bilateral resources in addition

to MAB. In North Africa and in Asia new network focussed on combatting desertification are being established.

6.6 The International Biosphere Reserve Network

This is the most formally developed and largest MAB Network with 266 biosphere reserves located in 70 countries throughout the world as at mid 1987. Co-operation among biosphere reserves involves the sharing of experience and information and the development of coordinated monitoring and research projects.

Because of their secure protection, generally large size and the inclusion of areas free from significant human impact, biosphere reserves typically provide ideal sites for monitoring changes in the physical and biological components of the biosphere. Their protection and scientific mission, backed up usually by the presence of research facilities, make biosphere reserves particularly attractive sites for longer-term research programmes and for comparative analyses. Biosphere reserves therefore provide the ideal geographic locus for international MAB pilot projects and MAB comparative studies, as well as for monitoring of regional and global pollutants.

The network is linked by the Biosphere Reserve Information System, and special compilations on Biosphere Reserves are submitted to the MAB Council.

7. INSTITUTIONAL DEVELOPMENT

There is no formal arrangement within the MAB Programme concerning institutional development. However, through support (financial and intellectual) to research projects, training programmes and to individual scientists, MAB has, over the years, helped many institutions to strengthen their research and training capability both nationally and internationally. In some cases, MAB has been at the origin of these initiatives and the institutions concerned are fully identified with MAB and Unesco: such is the case of KALRES in Kenya. In other cases, such as ICIMOD in Nepal, MAB has helped only in the first stages of development of institutions, which become fully independant as they mature.

The two aforementioned examples of institutional development are outlined below. More information can be obtained from the MAB Secretariat concerning these institutions and on possibilities of MAB support to other institutions.

7.1 Kenya Arid Lands Research Station (KALRES)

From 1976 to 1984 the Integrated Project on Arid Lands, known as IPAL, was carried out in Northern Kenya as part of the MAB Programme under Project areas 3 on grasslands and 4 on arid and semi-arid lands. The rationale for this project was to obtain the scientific information required for ecologically sound development of an area characterized by increasing desertification. While concentrating on the local situation, IPAL was able to generate and cumulate results that are relevant not only for northern Kenya, but for the Sahelian zone in Africa south of the Sahara as a whole,

and to some extent for arid and semi-arid zones world-wide. The first phase of IPAL (1976 to mid-1980) was sponsored by UNEP and implemented by Unesco-MAB. The second phase (1980-84) was sponsored by the Federal Republic of Germany. When IPAL came to an end in 1984, the Government of Kenya wished to continue the work on a national basis, to capitalise on the valuable data cumulated over a seven-year period and to make best use of the research station at Marsabit and the sub-stations of varying sizes located elsewhere in the District. In order to assist the Government of Kenya to establish the Kenya Arid Lands Research Station (as IPAL then became) during an initial three-year phase, the Government of the Federal Republic of Germany agreed to provide support through a funds-in-trust arrangement with Unesco-MAB. Hence KALRES in its first phase is a joint venture of Unesco-MAB and the Kenyan Ministry of Agriculture and Livestock Development. It will become a full Kenyan initiative in the second phase beginning 1988. There is also a proposal to convert KALRES into a sub-regional research and training centre.

7.2 International Centre for Integrated Mountain Development (ICIMOD) in the Hindu Kush-Himalayas (Kathmandu, Nepal)

ICIMOD forms part of a new type of "scientific" institution promoted in particular under MAB. Their specific focus is on the link between science and development, in this case ecologically-sound development of mountain regions. The impetus for the founding of ICIMOD from the MAB regional meeting on integrated ecological research and training needs in the mountain systems of Southern Asia, particularly the Hindu Kush-himalayas (Kathmandu, 1985). The meeting, attended by delegations from most of the countries of the region, strongly recommended the setting up of a regional institution focussing on documentation, promotion of research, training in integrated mountain development and technical advisory services. The need for a Centre was seriously felt in the region concentrating on the application of an effective comprehensive approach to the problems of deforestation, increasing erosion and landsliding, reduced soil fertility, and unplanned urbanisation.

MAB not only provided the impetus for the creation of ICIMOD, but was also decisive in the "integrated management" approach taken by the Centre and being promoted by it. Moreover, Unesco is a partner with the host country and the countries in the Hindu Kush-Himalayas region in providing seed funds, legal advice and institution building know-how. Unesco-MAB has acted as a broker in finding the funds necessary for the setting up and operation of the Centre. The major funding is contributed by the Governments of the Federal Republic of Germany and Switzerland. Financial support is also provided by China (People's Rep. of), India and Nepal.

8. MAB TRAINING

8.1 Role of training within MAB

By definition, the MAB gives priority to training activities in close association with the research programme. the main ingredients in MAB training activities are:

- **interdisciplinarity**, to enable future MAB scientists to become good specialists who also have a wide understanding of subjects of relevance to the rational use and conservation of natural resources;

- **on site, non-formal training,** generally for short periods in the sites of MAB comparative studies, MAB pilot projects and within biosphere reserves. The demonstration and extension activities associated with MAB projects are a key element in this regard;

- **training of young scientists,** particularly from developing countries in order to build up the cadre of trained scientists responsible for land use development;

- **training of future decision-makers,** through centres of excellence, for example the post-graduate courses provided at selected Universities.

MAB training activities are complementary to the formal and non-formal educational activities undertaken as part of the other international scientific Unesco programmes, notably those of the Intergovernmental Oceanographic Commission (IOC), the International Hydrological Programme (IHP), the coastal Marine (COMAR) programme of the Division of Marine Sciences, and the International Geological Correlation Programme (IGCP). Activities related to environmental education for children and the general public, such as the use of the MAB Poster exhibit "Ecology in Action", are carried out in coordination with the joint Unesco/UNEP International Environmental Education Programme (IEEP) with the Education Sector of Unesco.

8.2 Actual and perspective

To date, although training activities have always been present in MAB, there has been a heavy emphasis on formal training courses given in industrialised countries. A brief outline of some of these courses is given below in section 8.3.

Information on short, ad hoc training courses, often based on the sites and the findings of MAB field projects, is given in each issue on InfoMAB. Examples of topics treated by such training activities in 1986-87 include:

- agroforestry, use of computor-based quantitative methods for environmental biologists;

- integrated island development;

- conservation planning in the humid tropics;

- urban planning and human settlement management;

- watershed management;

- inventories of biological diversity in tropical protected areas.

The MAB training programme is being revised to bring it in line with the MAB training ingredients given above. In particular, a proposal will be drawn up for a MAB "Young scientist award scheme" on a competitive basis. More information can be obtained by writing to the MAB Secretariat.

8.3. Formal training courses related to MAB activities

1. Annual training programme in Integrated Pastoral Management of the Sahel (Formation en Aménagement pastoral intégré au Sahel, FAPIS)

This course is jointly financed by UNDP and UNSO and implemented by Unesco-MAB in collaboration with the Institut du Sahel and FAO. It aims at increasing the numbers of francophone specialists in increasing the numbers of francophone specialists in integrated pastoral management who can work in the numerous pastoral development projects underway in the 8 Member States (Burkina Faso, Cape Verde, Chad, Gambia, Mali, Mauritania, Niger and Senegal) of the Inter-Etats de lutte contre la désertification (CILSS) and thereby to strengthen the capacity of these countries to respond to rural development needs in general. There are three levels of training: **1)** for future executive personnel (cadres supérieurs); **2)** for future project technicians (cadres intermédiaires); and **3)** refresher courses for planners responsible for rural development projects.

More information can be obtained from:

Coordonnateur du FAPIS
Campus Universitaire, B.P. 5077
Université de Dakar
(Sénégal)

2. The International Post-graduate Course in Ecological Approaches to Resource Development, Land Management and Impact Assessment in Developing Countries.

This Unesco/UNEP training course is held annually from the beginning of October to the end of July at the Technical University of Dresden (German Democratic Republic). The course aims at increasing the numbers of specialists responsible for natural resource development and land management in developing countries. A total of 15-18 candidates are accepted each year. Candidates should have a B.Sc. or a B.A. or equivalent, or comparable practical qualifications. The working language is English. There are theoretical and practical courses on topics such as principles of ecology, agro-ecosystems, land use planning and food production, environmental economics, etc.

More information can be obtained from:

Prof. Dr. E. Seidel,
Schnellerstrasse 140,
119 Berlin - DDR
German Democratic Republic

or from:

The Technical University of Dresden
DDR - 8027 Dresden
Mommsenstrasse, 13
German Democratic Republic

3. Post-graduate course in Integrated Study and Rational Use of Natural Resources.

This training course is held annually from 15 September to 15 August at the Universities of Paris, Montpellier, and Toulouse (France). The course is conducted in French and includes the teaching of subjects required to carry out integrated studies, such as statistics, hydrology, geomorphology, pedology, animal and plant ecology, human geography and sociology, The course is open to about 15 candidates mainly from developing countries who possess a "diplôme de fin de 2ème cycle" (maîtrise) or a diplôme d'une école supérieure", or equivalent, or at least five years' professional experience in a discipline related to land use and management.

More information can be obtained from:

Commission française de l'Unesco
42 Avenue Raymond Poincaré
75116 Paris, France

4. International Post-graduate training Course in Integrated Surveys.

This course is held annually from 1st October to 30 June at the Unesco-ITC Centre for Integrated Surveys in Enschede, the Netherlands. The curriculum covers a wide range of topics related to integrated surveys for socio-economic development, such as economics and project evaluation, land classification, plant ecology and vegetation surveys, photo-interpretation, etc. A six week field course is normally carried out in a developing country. The course takes in 15-20 participants, mainly from developing countries, with a B.Sc., B.A. degree or equivalent, or with several years' practical experience in their field of specialisation. A very good knowledge of English is required.

More information can be obtained from:

ITC-Unesco Centre for Integrated Surveys
P.O. Box 6
Enschede
The Netherlands

Other training courses on specific topics related to the MAB Programme include:

International Post-graduate training course in Limnology, University of Vienna, Austria.

Information available from:

Limnologisches Institut
Bergasse 18/19
A -1090 Vienna
Austria

Post-graduate Training Courses in Soil Science and Plant Biology, Estacion Experimental del Zaidein, Granada and Sevilla Universities, Spain.

Information available from:

Estacion Experimental del Zaidin
Avenada de Cervantes
Apartado 419
Granada
Spain

Post-graduate Training Course in Soil Science, University of Ghent, Belgium.

Information available from:

The International Training Centre for Post-graduate Soil Scientists
44, Rozier
B - 9000 Ghent
Belgium

Training Course on the Establishment and Use of National Soil Reference Collections, Wageningen, The Netherlands.

Information available from:

International soil Reference and Information Centre
9 Duivendaal, P.O. Box 353
6700 AJ Wageningen
The Netherlands.

9. IMPROVING INFORMATION FLOW

A major objective of MAB is to transmit scientific information to those who can make use of it. This includes the scientific community, national and local governments, planners, decision-makers, educators and the general public.

These different audiences require different types of information and the international charter of MAB means that publications are produced in as many languages as possible.

From a modest beginning in 1971 with the publication of the first Green Report (MAB Report Series), MAB has developed various information services described below. However, all these efforts at the international level are dependent on information coming in to MAB from the scientific community and MAB National Committees. Information flow can only be sustained if it is a two-way process. Information at the international level is also only a small part of the large volume of research and meeting reports, newsletters and scientific books and papers published by National MAB Committees and the MAB scientific community at large. MAB national Committees are requested to provide the international MAB Secretariat with 3 copies

of each national MAB publication (or audio-visual).

For information on ational MAB publications, contact the National MAB Committee for the country concerned.

A word should be given on the MAB logo:  . This logo incorporates the stylised version of the ancient Egyptian sign for life known as the "ankh" (☥). This logo has been used almost systematically on the cover of all MAB publications - whether national or international. MAB National Committees are encouraged to continue this practice, and to use the MAB logo on any brochures, posters, audio-visual material etc. produced on MAB activities to maintain the identification with the programme.

9.1 MAB Book Series

A MAB Book Series is being launched in co-operation with a commercial publisher. This series contains major research reports and state-of-the-art surveys within the general area of ecology, natural resource management, conservation and human ecology, with particular emphasis on the "MAB integrated ecological approach".

Proposed first titles in the series include: Eutrophication Control; Arid Land Research in Northern Kenya; Urbanisation and Environmental Change; Rainforest generation and management. The MAB Book Series is directed by the Secretary of the MAB Council in cooperation with an Editor-in-chief and an Editorial Board specially designated for this purpose. The first books of the series are in English: if these prove successful, other language versions will be prepared.

9.2 MAB Technical Notes

This scientific series was lauched in 1974 to disseminate MAB research results, and provide guidelines on research methods and techniques, including cartography.

Titles in this series include: Population-environment relations in tropical islands: the case of eastern Fiji (N° 13); Guidelines for field studies in environmental perception (N° 5); Map of the world distribution of arid lands (N° 7); and Guidelines for soil survey and land evaluation in ecological research (N° 17). Most MAB Technical Notes have been prepared in English and French and certain titles also exist in Spanish. They can be obtained from the MAB Secretariat and from official distributors of Unesco publications.

9.3 MAB Report Series (Green Reports)

This report series started in 1971 with the report of the first session of the MAB-ICC primarily designed to record the discussions and recommendations of MAB meetings, including those of the International Coordinating Council, Expert Panels, Task Forces and Scientific Advisory Panels. These reports are essentially aimed at MAB National Committees and participating scientists. The Reports pertaining to the sessions of the MAB Council are available in English, French, Spanish, Russian and a few also in Arabic. Other Reports are available in English and French. These reports are available on request according to supplies from MAB Secretariat.

9.4 MAB Information System

This system consists of an occasional series of compilations to provide updated information on MAB field projects inventories (Blue series), Biosphere Reserves (Red series), MAB National Committees (Yellow series); and MAB documentation system and bibliographic services. These publications are aimed at National MAB Committees and participating scientists. The MAB bibliographic services are provided with the assistance of the MAB National Committee for France through the Centre International de Documentation en Agronomie des Régions Chaudes (CIDARC) at Montpellier (France). These documents are available on request according to supplies from MAB Secretariat.

9.5 InfoMAB

MAB's in-house newsletter was started in 1984 and is distributed three times per year in English, French and Spanish. It is designed to provide news quickly from, and to, the international MAB community to complement national MAB newsletters. InfoMAB includes project updates, announcements of meetings, training seminars, publications, an annotated bibliography, and news from MAB National Committees.

InfoMAB is available on request from MAB Secretariat or from MAB National Committees.

9.6 MAB Publications Catalogue

This is a brochure in English and French listing main MAB publications.

9.7 MAB Biennial Report

This series started in 1987 to provide an overview of MAB activities in an attractive format.

Prospectus for MAB

This publication is an introduction to the objectives, organisations and activities of the Man and the Biosphere Programme. It contains less information than the "Practical Guide" but has a wider distribution.

9.8 Audio-visual Series, video-cassettes, Films

A slide-tape series presenting the main MAB themes for a general audience, in English and French.

Titles include:
- Man and the Humid Tropics
- Man and Mountains
- Man: the key to conservation
- Man in arid lands: nomads in transition

In addition, MAB is cooperating with other units in Unesco and with professional film producers to make documentary films, videos and television programmes to disseminate its research findings to a wide audience

internationally and to promote the MAB integrated ecological approach to resource management and conservation. More information can be obtained from the MAB Secretariat.

9.9 Nature and Resources

This in-house journal has been published quarterly in English, French, Spanish, Chinese and Russian since 1971 by Unesco and includes the Bulletin of MAB (scientific articles and reports on meetings and publications) as well as the Bulletins of the International Hydrological Programme and the International Geological Correlation Programme.

For more information and subscriptions, contact:

Nature and Resources
Unesco
Place de Fontenoy
75700 Paris, France

10. COOPERATION WITH OTHER INTERNATIONAL ORGANISATIONS AND PROGRAMMES

10.1 Partners for implementation

In implementing the MAB Programme, Unesco seeks the active cooperation of governmental and non-governmental organisations and programmes working in related fields. These collaborative efforts aim at combining the strengths of the different organisations and avoiding unnecessary overlap or duplication of effort. Cooperation with international non-governmental organisations, in particular ICSU, provides a means by which the skills and expertise of the international scientific community are made available most usefully to MAB.

The complete list of the international organisations and programmes which collaborate with MAB is too long to be enumerated here. It would include in particular many more member unions and committees of ICSU such as INTECOL, IGU and SCOPE, as well as the International Council of Social Sciences (ICSS). Some examples are given below:

MAB activities in the **humid tropics** have been undertaken in collaboration with UNEP, FAO (notably under the FAO Tropical Forestry Action Plan) and IUFRO. More recently, comparative studies under MAB on issues in tropical ecology have been developed as joint Unesco-MAB/ICSU-IUBS ventures in the framework of the IUBS Decade of the Tropics.

For **arid and semi-arid lands**, close collaboration has been established with UNEP, UNSO and FAO, particularly within the context of the implementation of the Plan of Action to Combat Desertification. An Inter-Agency Working Group on Desertification has been charged to coordinate relevant activities within the UN family and to promote collaborative programmes and projects. Close collaboration has also been developed between Unesco-MAB and specialised regional institutions such as the Arab Centre on the Studies of Arid Zones and Drylands (ACSAD) and the Intergovernmental Committee to Combat Desertification in the Sudano-Sahelian Region (CILSS).

MAB **Urban projects** have been undertaken in collaboration with UNEP, Habitat (UNCHS), IIASA and IFIAS (Project Ecoville). Under a joint

Unesco/MABUNEP Project, several pilot projects were undertaken between 1975-85, including case studies in Hong Kong and Kuala Lumpur. A series of case studies in francophone Africa have been conducted in collaboration with IFIAS (Project Ecoville). More recently, collaboration is taking place with ICSU-SCOPE, IIASA and IFIAS (Project Ecoville) to examine the role of modelling in urban management. Future collaboration with these organisations will focus on the role of expert systems in urban risk management.

The **Action Plan for Biosphere Reserves** was submitted to the Executive Board of Unesco at its 121st session held at Unesco Headquarters in May 1985. The Executive Board adopted decision 5.3.2 in which it recommended Member States and other interested international organizations to "...take all the necessary steps to ensure the immediate implementation of the Action Plan" and invited the Director General of Unesco to "...give high priority to the implementation of the Action Plan in the current and future programmes of the Organization". This decision was endorsed by the Unesco General Conference at its 23rd session held in Sofia in October 1985. The Action Plan for Biosphere Reserves was also submitted to the international organisations associated with its implementation, notably the other members of the Ecosystem Conservation Group, i.e. UNEP, FAO and IUCN. The Governing Council of UNEP, at its 13th session held in Nairobi in May 1985, took decision N° 13/28 in which States were urged to "... take all necessary steps at the national, regional and international levels to set up or improve biosphere reserves and take part in the development and operation of the world network of biosphere reserves, paying particular attention to the establishment and adequate maintenance of biosphere reserves considered to be of special international importance." The Governing Council of UNEP furthermore invited the Executive Director of UNEP "... to extend all possible support and assistance to the implementation of the Action Plan and to report to it at its fourteenth session on progress achieved in this respect." FAO has indicated its commitment to implement those actions of the Plan which came under its responsibility. THe General Assembly of IUCN, at its 16th session held in Madrid (spain) in November 1984, adopted Resolution N° 16/32 inviting "... all IUCN components to enhance the role of biosphere reserves in programmes for ecosystem conservation and integrated rural development...".

10.2 A new partner: the International Geosphere-Biosphere Programme

In September 1986, ICSU launched the International Geosphere-Biosphere Programme which has the overall objective "...to describe and understand the interactive physical, chemical and biological processes that regulate the total Earth system, the unique environment it provides for life, the changes that are occurring in this system, and the manner in which they are influenced by human actions". Four basic themes have been judged crucial in the development of the IGBP: 1) large scale modelling of global change, 2) change in atmospheric chemistry associated with modifications of terrestrial ecosystems and biota, 3) ecosystem processes, and 4) survey, monitoring and inventory of terrestrial ecosystems.

It is very likely that the IGBP will have many links with MAB, and that many complementary projects could be planned in the coming years. In particular, the IGCP has recognised the need of having "... a few carefully selected stations where detailed measurements are made of environmental parameters and of ecosystem functional properties. These stations could

be based on existing programmes such as the MAB biosphere reserves...". The idea of basing these Biosphere Observatories on suitable biosphere reserves was discussed in January 1986 at a SCOPE/MAB workshop on "Definition and Designation of Biosphere Observatories for Studying Global Change".

10.3 Partners for financial support

It is recalled first of all that MAB is a decentralised programme implemented by the MAB National Committees of participating countries essentially with financial support from national sources. MAB National Committees have therefore the key responsibility for promoting MAB activities within their countries and obtaining the necessary financial support from national sources. However, certain MAB National Committees -- particularly those of developing countries -- need vital multilateral support such as that of Unesco and of other international organisations, or bilateral support from donor countries, to help them in the implementation of MAB activities.

Unesco itself is an agency of the United nations System which is responsible for carrying out the programmes of its mandate in its Member States. As such it is therefore not a funding agency: accordingly only limited, catalytic financial support is available to act as "seed money" for national MAB initiatives which contribute to the international programme. This support comes from the Unesco "Regular Programme". Each year it is set out in a fixed budget covering the different MAB activities planned or anticipated for that year. Thus MAB National Committees can ask for financial support for MAB activities which are foreseen in this annual budget by submitting a request to the Director, Division of Ecological Sciences. The request should be accompanied by a brief description and timetable of the project or activities to be undertaken and their relevance to the MAB Programme, an overall budget indicating the counterpart national contribution and other, if any, financial sponsors.

Another form of Unesco support is available under the "Participation Programme" of Unesco, designed to ensure an equitable distribution of Unesco resources for activities which are complementary to those of Unesco's sectoral core programmes. More information on the possibilities for support for specific projects under the Participation Programme as well as on all Unesco programmes is available from all the Unesco National Commissions of Unesco Member States.

There are possibilities of financial support from funding agencies in the United Nations system such as UNEP, UNSO and UNDP but the amounts available are limited and priority is given to development projects which correspond to the mandates and interests of the different agencies. MAB National Committees can request the assistance of the MAB Secretariat in the preparation of project proposals which involve activities contributing to the international MAB Programme, as well as its assistance in the presentation of such projects to the agencies concerned and in their implementation. It is recommended that MAB National Committees work closely with their national planning departments or ministries in the elaboration of such projects.

The MAB Secretariat can assist MAB national Committees of developing countries in a similar manner to develop projects for bilateral funding, or for regional projects. In a very limited number of cases, funds-in-

trust arrangements can be made with Unesco and interested donor countries for projects to be carried out in developing countries. The MAB Secretariat can advise MAB National Committees on the possibilities of such arrangements.The MAB Secretariat can also provide advice on the possibilities of support from the World Bank, the European Economic Coummunity (EEC), or from development agencies such as CIDA (Canada) etc.

In the field of nature conservation and the protection of natural heritage, financial support is available to countries which are States Parties to Unesco's Convention concerning the Protection of the World Cultural and Natural Heritage under the World Heritage Fund. This financial support takes several forms, including: preparatory assistance to draw up indicative lists of cultural and/or natural heritage according to the terms of the Convention, or to prepare nominations to the World Heritage List; technical cooperation for sites which are inscribed on the World Heritage List; support for training projects and study grants in the field of nature conservation. Full details are given in the "Operational Guidelines for the Implementation of the World Heritage Convention", copies of which are available from the MAB Secretariat, from Unesco regional offices and from Unesco National Commissions.